Ethnic differences in illness representations, coping and adjustment in people with coronary heart disease

Thesis

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ABSTRACT

Background and Aims

There have been few studies examining ethnic differences in people's illness representations. The aim of this research was to explore the relationship between ethnicity and illness representations, coping, perceived health status and psychological adjustment in participants with coronary heart disease (CHD). Furthermore, within a Punjabi group, it aimed to explore the relationship between these variables and acculturation, as well as the relationship between illness representations, coping and adjustment.

Design and Participants

The study was cross-sectional employing a between and within group design incorporating comparative and correlational analyses. The sample included 47 Punjabi participants and 44 Caucasian participants with diagnosed CHD, recruited from a cardiology clinic and a Gurdwara (Sikh temple).

Measures

Variables were measured using a range of quantitative questionnaires, which were translated into Punjabi.

Results

Ethnic differences were found in participants' illness representations and in particular causal beliefs. Only one coping strategy was significantly different between the two groups and there were no differences on perceived health status measures or in anxiety levels. However, the Punjabi group were significantly more depressed. Within the Punjabi group,

acculturation was found to be associated with illness representations, coping and physical functioning. Illness representations were associated with adjustment measures, however there were few associations between illness representations and coping, and between coping and adjustment.

Overall, ethnicity did not account for any of the variance in perceived physical functioning or anxiety levels, but accounted for 11 percent of the variance in depression levels. Illness representations were more important than ethnicity and coping in accounting for the variance in perceived physical functioning and psychological adjustment.

Implications

The results are discussed in terms of the self-regulatory model and future research is suggested. Clinical implications for the undertaking of culturally sensitive work with Punjabi clients with CHD, are discussed.

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1. INTRODUCTION

1.1 Introduction to the Review

This study explores whether there are ethnic differences in how people view their heart condition, the way that they cope and the impact that it has on their psychological adjustment and perceived health status. This is examined using Leventhal, Dienfenbach and Leventhal's (1992) self-regulatory model as a theoretical framework. The introduction begins with an overview of coronary heart disease and its psychological impact, before going on to review the literature on the self-regulatory model and ethnic differences in illness behaviour. Finally issues around undertaking cross-cultural research are discussed.

1.2. Coronary Heart Disease (CHD)

CHD is most commonly caused by a narrowing of the arteries which provide oxygen to the cardiac muscle, due to the accumulation of cholesterol, cellular debris and calcium. This causes a fixed obstruction to the coronary blood flow (Camm, 1990).

1.2.1 Prevalence of CHD

CHDis the leading cause of death in the UK. It is responsible for 33 percent of deaths in men under 65 years and 28 percent of all deaths. In 1992, it accounted per million, for 4300 deaths among men and 2721 deaths among woman (Ogden, 1996).

1.2.2 Risk Factors

Risk factors for CHD include hypertension, raised serum cholesterol levels, smoking, obesity, age, family history, ethnicity and social class (Bennett, 1993; Ogden, 1996). These factors interact to increase the risk of CHD exponentially. Debate has occurred as to whether certain personality types, such as type A behaviour, stress and low exercise levels are associated with CHD.

1.2.3 Main Manifestations

Angina and myocardial infarction (MI) are the main manifestations of CHD(Camm, 1990). Angina is a chronic symptom which is experienced as shortness of breath and pain in the chest and/or left arm. It may be triggered by stress, extremes of emotion, as well as physical exertion. People with angina are at increased risk of having a MI or stroke (Johnston, 1997). During a MI, an artery providing oxygen to part of the cardiac muscle becomes totally occluded, resulting in irreversible muscle death. About two-thirds of those who have a MI survive and go on to achieve some degree of recovery (Bennett, 1993).

1.2.4 Management

Angina is the commonest symptom of CHD requiring treatment. (Johnston, 1997). The basis of treatment is, if possible, to prevent all attacks of angina, since any single attack has the potential to proceed to a MI (Balcon, 1987). If angina persists despite medical treatment, is severe, frequent, occurs at rest or on minimal exertion, surgery is considered (Camm, 1990). The most common

types of surgery for CHD are coronary angioplasty and coronary artery bypass graft surgery (CABG). CABG is approximately 85 percent successful at relieving angina, however there is a reoccurrence of symptoms in approximately eight percent of patients every year (Balcon, 1987). Angioplasty is a less invasive form of surgery, but 20-34 percent of patients will have a re-occurrence of symptoms during the first six months.

1.3 CHD in People from South Asia

1.3.1 Prevalence

In the UK, people of South Asian[1] origin form one of the largest ethnic minority groups, comprising three percent of the total population. Most South Asians live in the larger cities, such as London, where they comprise nearly a fifth of the population aged between 40 and 64 years old (Chaturvedic, Rai & Ben-Shlomo, 1997).

CHD rates have been noted, in several parts of the world to be particularly high in people of South Asian origin (McKeigue, Miller & Marmot, 1989). Due to a lack of ethnic monitoring, there is little up-to-date comprehensive data on mortality from CHD in South Asians. However, figures for 1979-1983 show that in British South Asian men and women, mortality from CHD was higher than the

[1]"South Asian" refers to people who originate from the Indian subcontinent which includes Pakistan, India, Bangladesh and Sri Lanka. It has been suggested that this is a more appropriate term than the more commonly used term in the UK of "Asian", as Asia includes East and South East Asia and is generally used in the USA to refer to people of East Asian origin (Lambert & Sevak, 1996).

national average by 36 percent and 46 percent respectively. In particular, there was a two to three fold excess mortality from CHD in 20-39 year old South Asians. South Asians were also the only ethnic group to experience a rise in CHD mortality between 1970-72 and 1979-83 (6% in men and 13% in women) (Balarajan & Raleigh, 1993). As the age distribution of South Asians in the UK is younger than that of the general population, mortality figures for CHD are set to rise as the population ages (Shaukat, Lear, Lowy, Fletcher, de Bono & Woods, 1997).

1.3.2 Risk Factors

Given the increased prevalence of CHD in South Asian migrants and their descendants, studies have searched for common risk factors in this group. However, no differences have been reported in the occurrence of classic coronary risk factors such as dietary fat, serum cholesterol levels, smoking and hypertension (McKeigue et al., 1989). Interest has also focused on the role of particular stressors in South Asians' lives from socioeconomic deprivation, the process of migration and racial discrimination (Williams, Bhopal & Hunt, 1994). However, the findings in this area have been equivocal (McKeigue et al., 1989).

1.4. CHD and Psychological Well-Being

People with CHD have to cope with the many threats posed by their illness. These can include pain, the loss or impairment of the ability to work and the effect that this can then have on self-esteem and sense of self-worth, as well as the potential loss of many other social and interpersonal functions (Cohen-Cole, 1989).

Difficulties in coping with these stressors can lead to emotional disturbance and depression. Depression has been reported to be common in CHD, with prevalence estimates ranging from 18-60 percent (Carney, Rich, Tevelde, Saini, Clark & Jaffe, 1987). Carney et al. (1987) suggest that the variability in these figures may reflect the fact that symptoms such as fatigue, which are often regarded as synonymous with depression, are also common in patients with medical illnesses.

Research which has examined quality of life following either CABG, angioplasty or MI has found that they all result in a period of emotional turmoil (Westin, Carlsson, Israelsson, Willenheimer, Cline & McNeil, 1997). At one month following the event, depression and self-esteem levels were poorer for all three groups than for controls. Schleifer, Macari-Hinson, Coyle, Slater, Kahn, Gorlin and Zucker (1989) found that at three to four months following their MI, as many as one third of patients met the criteria for depression. Prevalence rates for depression one year after coronary artery surgery have been reported as being approximately 20 percent (Pimm & Jude, 1990).

Fear and uncertainty are also common among cardiac patients. One year after their first MI, 74 percent of patients experienced frequent worries concerning their cardiac state and symptoms, while 58 percent reported that they were protected from physical exertion by their friends and family, frequently as a consequence of anxiety, rather than symptom severity (Wiklund, Sanne, Vedin, & Wilhelmsson, 1984).

Psychosocial factors have been associated with impairment levels. The degree of impairment from angina is very variable, from it being a severely limiting and distressing symptom, to people with mild angina being able to lead near normal lives. However, whilst there has been reported to be little association between impairment of cardiac function and physical limitations (Mayou, 1989), degree of disability has been associated with anxiety, depression, hypochondriasis, anger and type A behaviour (Ladwig, Roll, Breithardt, Budde & Borggrefe, 1994; Smith, Follick & Korr, 1984).

Psychosocial status has also been shown to outweigh physical health status in predicting return to work and previous levels of social and leisure activities, following a cardiac event (Diederiks, Bar, Hoppener, Vonken, Appels & Wellens,1991; Ladwig et al., 1994). Moreover, depression score has been reported as a significant predictor of medical outcome. Lesperance, Frasure-Smith and Talajic (1996) found that depression in hospital following a MI, although not associated with any cardiac disease severity indices, was associated with an increased risk of mortality over the following 18 months. Similarly, Levine, Covino, Slack, Safran, Safran, Boro, Davis, Buchanan and Gervino (1996) in a prospective study of patients who had experienced either a MI, angioplasty or CABG, report that depression score was a significant predictor of number of days of cardiac-related rehospitalisation and days of rehospitalisation for any reason, even when disease severity was controlled for.

Although, these studies have provided evidence for the prevalence of psychological distress in CHD and its affect on long-term outcome, they have generally been descriptive, with no attempts to provide a theoretical explanation for their findings. A model which has sought to provide a theoretical framework as to the variation in illness behaviour, is the self-regulatory model.

1.5 The Self-Regulatory Model of Illness

The self-regulatory model of illness (Leventhal et al., 1992) provides a comprehensive description of the way that people conceptualise their illness. In this model, illness is regarded as a problem and the patient's behaviour is seen as an attempt to solve the problem. Patients respond to illness in a dynamic way based on their interpretation and evaluation of the illness, and the perceived outcome of coping strategies.

Leventhal et al. (1992) propose that when individuals are exposed to internal (e.g. symptoms) and/or environmental (e.g. a diagnosis from the doctor) health threats, they actively construct a model or representation of this health threat. This representation assigns meaning to the health threat and is constructed on five distinct dimensions: *identity; cause; timeline; cure/controllability* and *consequences*. The *identity* attribute includes a disease label and the individual's ideas about the somatic representation of that disease, such as the location, extent and feel of its symptoms. The *cause* attribute concerns beliefs about the cause of the illness. *Timeline* connects the illness to an expected time frame, such as whether it is acute, chronic or cyclical. *Cure/controllability*

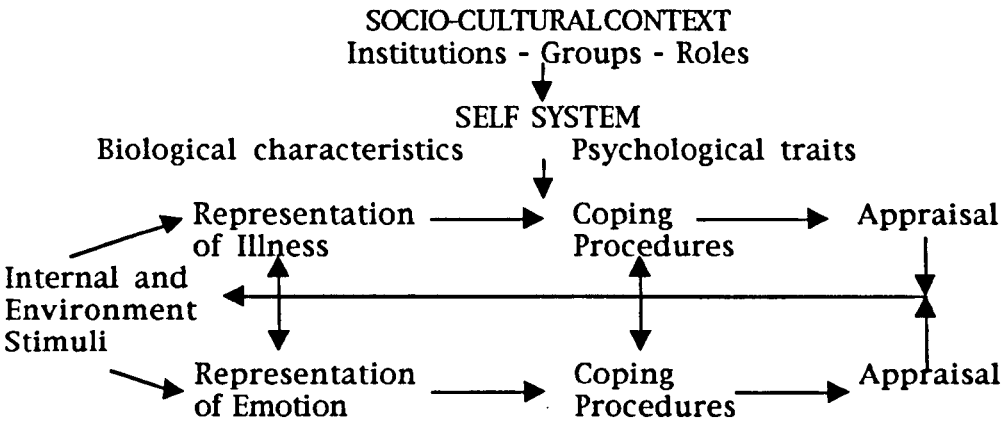
concerns beliefs about the potential to cure or control the illness and *consequences* concerns the perceived physical, psychosocial and economic implications of the illness.

Patients' representation of their illness influence the selection and performance of one or more coping procedures. Coping has been defined as "the person's cognitive and behavioural efforts to manage the internal and external demands of the person-environment transaction, that are appraised as taxing or exceeding the person's resources" (Folkman, Lazarus, Gruen & DeLongis, 1986). Coping can take many forms and there are many ways in which coping responses can be grouped. For example, distinctions have been made between active and avoidant coping (Taylor, 1990) and between problem-focused and emotion-focused coping (Lazarus & Folkman, 1984). Problem-focused strategies are generally seen as being particularly useful in managing controllable stressors, whilst emotion-focused strategies are well-suited to managing the impact of uncontrollable stressors (Taylor, 1990). Some emotion-focused strategies, such as positive reframing of the illness, acceptance of the disease and utilising social support, appear to be adaptive across illnesses (Petrie & Moss-Morris, 1997). Of the problem-focused strategies, information seeking about the illness and planning seem to have the most consistent relationship with positive outcomes (Felton, Revenson & Hinrichsen, 1984). Strategies such as self-blame, emotional ventilation and cognitive and behavioural avoidance have generally been related to poorer adjustment to disease (Moss-Morris, Petrie & Weinman, 1996).

The self-regulatory model views the selection of coping strategies as an ongoing process involving appraisal and feedback. In the third stage of the information-processing chain, the efficacy of the selected coping actions are evaluated and compared with expected outcomes. This may then result in changes in the representation and/or in the coping plans. Therefore, the process is seen as being self-regulating, with interactions proceeding in both directions. The model also views processing of health threats as occurring in parallel, on two largely independent levels. One creates the cognitive representation of the health threat, with its coping procedures and evaluative processes, and the other comprises the emotional processing system, which creates feeling states, and the coping procedures and appraisal rules for the management of emotion.

These processes are influenced by the individual's personal context, such as their experience of illness, view of their somatic self (i.e. whether symptoms are seen as something new or a stable part of the self) and personality disposition or traits. They are also influenced by the social and cultural context within which people live. Cultural context provides a framework for the individual construction of illness representation via shared common knowledge (e.g. which symptoms are acceptable) and influences illness-related behaviour (Diefenbach & Leventhal, 1996).

Figure 1. Leventhal's self-regulatory model of illness (Adapted from Leventhal et al., 1992)



1.6 Illness Representations, Coping, Psychological Adjustment and Health Status.

An association between illness perceptions, coping, psychological adjustment and disability levels has been reported in a number of medical groups (Kemp, Morley & Anderson, 1999; Moss-Morris et al., 1996). These studies have found that in particular, beliefs about illness identity, and the consequences of and control over their illness were associated in a conceptually logical manner with a number of coping strategies. Illness representations were found to be more influential than coping in predicting psychological outcome and dysfunction, with their finding suggesting that illness representations have both a direct and indirect effect (through coping strategies) on outcome. However, the cross-sectional design of these studies meant that causal interpretations could not be made.

Longitudinal studies on illness representations in people with CHD, have generally focused on patients who have experienced a MI.

Maeland and Havik (1987) found that MI patients' in-hospital expectations of their future work capacity, was a strong predictor of eventual return to work. However, Affleck, Tennen, Croog and Levine (1987) report that neither early attributions for their MI nor perceived control over their MI, predicted MI patients' health status ten months later. However, these studies were limited in their outcome measures.

Weinman, Petrie, Sharpe, and Walker (in press) have undertaken a more comprehensive longitudinal study of the associations between post-MI causal beliefs and changes in health behaviour six months later. Belief that faulty lifestyle caused their MI was significantly related to overall improvements in diet and increased frequency of strenuous exercise, whilst attributions related to stress or heredity, were not related to later changes in health behaviour. Beliefs concerning the control/cure of their illness, its time frame and consequences, also predicted later outcome (Petrie, Weinman, Sharpe & Buckley, 1996). Thus, attendance at a rehabilitation course was significantly related to a previous stronger belief that the illness could be cured/controlled, whilst return to work within six weeks was predicted by the perception that the illness would last a short time and have less grave consequences. Belief that their heart disease would have serious consequences was significantly related to increased later disability. Illness representation was largely unrelated to measures of illness severity.

These studies clearly suggest that an individual's perception of illness is associated with coping and long-term outcome.

1.7. Ethnic Differences in Illness Representation

Landrine and Klonoff (1992) have criticised psychology's relative disinterest in the influence of culture on health beliefs. They state that the Western cultural construction of illness has dominated research, with findings from White American participants frequently being taken as evidence of generalised "health-related beliefs". They highlight that in contrast to the Western cultural view of illness, as an episodic, intrapersonal deviation caused by microlevel, natural etiological agents such as viruses, in many non-Western cultures, illness is considered to be more of an interpersonal process, with macrolevel, interpersonal and supernatural etiological agents.

Cross-cultural studies examining causal beliefs about illness have reported that non-Western cultural groups are more likely to attribute their illness to supernatural agents, such as punishment from God, and social factors, as well as organic factors, common to the Western conception of illness (Edman & Kameoka, 1997; Landrine & Klonoff, 1994). However, these findings have generally been based on well-educated healthy college students.

In contrast, a study comparing "Western" (Jews born in Europe or the Americas) and "Oriental" (Jews born in the predominantly Moslem countries of North Africa and the Middle East) Israeli women with breast cancer, found that the "Oriental" women were more fatalistic in their view of their illness, as well as feeling more helpless, resigned and submissive (Baider & Sarell, 1983). The "Western" women however, tended to respond to the illness

by mobilising their own energies, trying to control their bodies and behaviours, and trusting the resources of medical science and health professionals. However, as this study had a small number of participants, its representativeness is questionable.

Cross-cultural health studies have reported ethnic differences in where symptoms are located, the number of symptoms, their effect on general well-being and the amount of pain expressed (Bates & Edwards, 1992; Zola, 1966). However, cross-cultural studies involving South Asian participants have been limited in number. This may reflect the fact that South Asians are a relatively small ethnic group in the USA. Research in the UK has suggested that South Asians report a greater pain intensity for a given stimulus than Anglo-Saxons and Afro-West Indians (Thomas & Rose, 1991). Interestingly, South Asians also evaluated themselves as having the least ability to cope with pain and the highest parental level of concern about minor childhood injuries, suggesting a possible mechanism by which cultural attitudes are learnt.

Sissons Joshi (1995) explored patients' causal beliefs about their own diabetes and diabetes in general, of British Caucasian patients in Brighton and Indian patients in Bombay. Diet was more frequently nominated by Indian participants as a causal factor. This may reflect the influence of Aruyvedic medicine (traditional medical beliefs in India) which places emphasis on diet as a cause of illness (Krause, 1989). Indians were also more likely to mention stress as a causal factor, with family obligations and responsibilities being the most common type of stress cited. In

contrast, British participants saw stress as primarily originating in the workplace or in their dealings with bureaucracies. Similarly, in exploring views about adjustment problems, the emphasis in British participants was on lost opportunities in their career and sporting aspirations, whilst Indian participants emphasised failed obligations in social and family roles.

Overall, levels of adjustment in the two groups were very similar. However, although for British participants having a causal belief for their diabetes was associated with good outcome, this relationship did not occur for Indian participants. Sissons Joshi (1995) discusses how attributions may perform different functions in different cultures, therefore theories developed in Western society may not be applicable to non-Western cultures. However, given this study's lack of robust outcome measures and limited analysis of the data, these conclusions must be considered tentatively.

Research into the health perceptions of healthy South Asians living in the UK has come from Lambert and Sevak (1996). In a qualitative study, they examined causal beliefs about illness in general and particularly concerning CHD. The most frequently mentioned cause of CHD was mental stress due to financial difficulties and interpersonal relationships. A great deal of emphasis was also placed on the importance of eating healthy foods in maintaining general health and on the climate, with the sun being seen as beneficial. A number of participants cited constitutional predisposition as being influential in whether individuals become ill. This was described as not only reflecting a

genetic predisposition to certain illnesses but also that due to the inherent nature of their constitution, certain people are vulnerable to certain illnesses.

In general, Lambert and Sevak (1996) noted that although many of the South Asian participants had fatalistic beliefs about ill health, these did not preclude belief in the individual's own ability to influence health status, through regulating food, lifestyle, exercise, smoking and alcohol consumption. They discuss that these health perceptions bear similarities to South Asian folk medicine humoral ideas. In these beliefs, health problems are rarely attributed to excesses or deficiencies of specified humours as in traditional Aryuvedic medicine[2], but to the general notion of balance and restraint, with diet and style of life being appropriate for the climate. Lambert and Sevak (1996) also point out that concepts such as stress, which occupy a prominent place in Western popular discourse, were interwoven with these more "traditional" understandings of the nature of ill health. This demonstrates that health beliefs amongst British South Asians are not static and unchanging but fluid, dynamic processes that are influenced by a number of cultures.

[2] Aryuvedic medicine describes the world as consisting of five elements: ether; wind; water; earth; fire. These elements are consumed through food and are transformed into three humours: wind; bile; phlegm. The body is seen as being in a healthy state when the three humours are in balance with each other (Krause, 1989).

1.8 Issues in Cross-Cultural Research

1.8.1 Methodological Issues

There has been much debate in cross-cultural literature between the relativist and universalist approaches (Krause, 1989). The strict universalist position assumes that there are fundamental concepts or categories of illness that are unproblematically universal, transcultural phenomena and as such it is possible to strip away cultural influences entirely from them. The relativist view is that there is no objective reality and that what we perceive to be reality is the result of individual perceptions, and cultural and social pressures. Therefore, in the strictly relativist view, it is believed that you cannot truly compare cultures because phenomena can only be understood within their own cultural context (Kagitcibasi & Berry, 1989).

In recent years however, there has been increased interest in exploring the middle ground between these two positions. This can be seen as the weaker claim that cultural differences do exist but there are also objective realities to the world (Krause, 1989). In this approach, what matters is not so much the diagnosis of the disease but the meaning and expression of the illness. Thus in establishing the validity of a disease category in a culture, it is not sufficient to establish the existence of the disease's symptoms but the category must also make sense to that population (Kleinman, 1987).

Issues of ethnocentric bias are particularly problematic in translating research instruments for use in a different culture, from the one within which they were developed. As highlighted by Van de Vijver and Hambleton (1996), the application of an instrument in a new cultural group, involves more than simply producing text in another language. Flaherty; Gaviria, Pathak, Mitchell, Wintrob, Richman and Birz (1988) have highlighted five dimensions which must be addressed in order to safeguard against bias and increase the cross-cultural validity of research instruments:

1. Content equivalence requires the content of each item to be relevant to the phenomena of each culture.
2. Semantic equivalence requires the meaning of each item to be the same in each culture.
3. Technical equivalence requires the method of assessment (e.g. pencil and paper) to be comparable in each culture, with respect to the data yielded.
4. Criterion equivalence requires the interpretation of the measurement of the variable to be the same when compared to the norms of each culture.
5. Conceptual equivalence requires the instrument to be measuring the same theoretical construct in each culture.

Each of these dimensions is seen as being mutually exclusive of the others and therefore any item or instrument may be cross-culturally equivalent on certain dimensions and not on others. Flaherty et al. (1988) suggest that cross-cultural adaptation rarely

yields equivalence on all five dimensions, although they see this as the ideal standard.

1.8.2 Political Issues

Cross-cultural research has been the source of much controversy and political debate. This is rooted in a history of research into ethnic differences being used as a means to oppress minority groups and supposedly demonstrate the superiority of the dominant culture (Ahmad, 1993). In health, cross-cultural research has been described as being used to make "black people sick" in that it has tended to blame ethnic minorities for ill health while ignoring issues such as socioeconomic status and racism (Donovan, 1984).

Some cross-cultural research in health has also been guilty of viewing ethnic minorities as the "Other" in which divergent ethnic groups are lumped together, ignoring differences (MacLachlan, 1997). Even when ethnic minority groups are differentiated, there is often a tendency to treat ethnic groups as homogenous and ignore the diversity within them, resulting in stereotypes being formed (Ahmad, 1996).

One way in which ethnic minority group members may differ from each other is in the degree to which they have modified their cultural identity and characteristics, as a result of exposure to a different culture. The process of transition which is brought about by the meeting of peoples from two different cultures is called acculturation (MacLachlan, 1997). Berry and Kim (1988)

have suggested that there are four possible outcomes of the acculturation process:

1.) Assimilation, in which a person takes on the identity and characteristics of the new culture and disowns his/her original culture.
2.) Integration, in which the person identifies with and exhibits characteristics of both the original and the new culture
3.) Separation or Rejection (depending on whether it is voluntary or imposed) is when a person retains his/her original cultural identity and does not want to adopt the new culture.
4.) Marginalization is when the person has little interest in identifying with or displaying the characteristics of either the original culture or the new culture.

Although this model presents degree of cultural identity as a dichotomized choice, MacLachlan (1997) discusses that it should be seen as a continuum.

Research has linked acculturation with psychological health. Cochrane and Stopes-Roes (1981) have reported increased psychological adjustment in Indians who were more acculturated to life in England. Similarly, marginalization and separation/rejection acculturation strategies have been associated with high levels of stress (Berry & Kim, 1988). Acculturation has also been linked with health behaviour. Lipton and Marbach (1984) have reported an association in different ethnic groups between acculturation and expressive responses to pain, as well as disruption in daily functioning caused by pain.

1.9 Summary and Rationale for Current Study

Research has demonstrated that psychological factors, including patients' illness beliefs, are very important in predicting both physical health status and emotional adjustment.

Previous research has suggested that a person's culture is fundamental in shaping their health-related beliefs. However to date, no study has explored illness representations and their relation to coping strategies, perceived health status and psychological adjustment, in people from non-Western cultures with CHD.This study was therefore designed to address some of these shortcomings.

A number of authors have highlighted the tendency of cross-cultural research to portray non-Western cultures as a homogenous group. There has also been a lack of studies exploring within ethnic minorities, how health perceptions are affected by degree of acculturation to the host country. Therefore, the present study will include a particular group of South Asians (i.e. Punjabis) whose illness perceptions and behaviour will be explored in relation to degree of acculturation. It is hoped that this study will provide increased understanding of how particular ethnic groups may differ in the ways that they perceive and respond to CHD,and so facilitate the undertaking of more effective therapeutic work with this group.

1.10 Aims

1. To explore whether there are differences in illness representations, coping strategies, perceived health status and psychological adjustment amongst participants from different ethnic groups. In particular, to examine illness representations that previous research has suggested may be particularly salient for South Asian participants.

2. To explore the relationships within a Punjabi group, between degree of acculturation and illness representations, coping strategies, perceived health status and psychological adjustment.

3. To examine the associations between illness representations, coping strategies, perceived health status and psychological adjustment within a Punjabi group.

4. To assess the relative contributions of ethnicity, illness representations and coping strategies to perceived physical functioning, anxiety and depression levels.

1.11 Hypotheses

Previous research has suggested the following one-tailed hypotheses:

1. Punjabi participants will have a stronger belief than Caucasian participants in the following factors as causes of their heart condition: a.) fate; b.) family-related stress; c.) having a weak constitution; d.) diet; e.) climate.

2.) Caucasian participants will have a stronger belief than Punjabi participants that work-related stress was a factor in causing their heart condition.

3.) Punjabi participants will have a stronger belief than Caucasian participants that:
a.) their heart condition has led to difficulties in their role in the family
b.) changes in their diet will improve their heart condition
c.) recovery from their heart condition is largely dependent on chance or fate.

Previous research does not give a clear indication of direction of results for the following hypotheses, therefore they are two-tailed.

4.) Ethnic groups will differ on measures of a.) illness representations (where direction of results has not been specified in one-tailed hypotheses), b.) coping strategies, c.) perceived health status, d.) anxiety and e.) depression.

5.) Within the Punjabi group, there will be an association between degree of acculturation and a.) illness representations, b.) coping strategies, c.) perceived health status, d.) anxiety and e.) depression.

6.) Within the Punjabi group, there will be an association between illness representations and a.) coping strategies, b.) perceived health status, c.) anxiety and d.) depression.

7.) Within the Punjabi group, there will be an association between coping strategies and a.) perceived health status, b.) anxiety and c.) depression.

8.) There will be a difference in the relative contributions of participants' ethnicity, illness representations and coping strategies to a.) perceived physical functioning, b.) anxiety and d.) depression.

2. METHOD

2.1 Ethical Approval

Ethical approval was gained for the study from the two ethical committees who were approached (appendix 1).

2.2 Design

The study employed a quantitative approach, using a between group design to compare the illness representations, coping, perceived health status and psychological adjustment, of people with CHD from two ethnic groups. A correlational design was employed within the Punjabi group, to explore the relationships between these variables, as well as their relationship with acculturation. A correlational design was also used for the whole group to examine the relative contributions of ethnicity, illness representations and coping to perceived physical functioning, anxiety and depression.

A number of demographic factors such as age, gender, socioeconomic status, educational level, CHD history (i.e. experience of angina, MI, CABG or angioplasty) and amount of prescribed angina-related medication (used as a measure of severity of CHD) were controlled for, to ensure that any differences between the two ethnic groups were not due to these factors.

Based on previous research (Petrie et al., 1996), a medium effect size of approximately 0.5 of a standard deviation would be expected. To detect this difference with power of 0.80, requires 64 participants in each group (Cohen, 1992).

2.3 Participants

Participants were recruited from two sites: a cardiology clinic in a teaching hospital and a health promotion day held at a Gurdwara (Sikh temple).

The inclusion criteria for participants was age between 18 and 65 years, with a diagnosis of CHD for at least three months. CHD must manifest itself as either chronic angina (i.e. present for at least three months) and/or experience of a major cardiac event (MI, CABG or angioplasty), three to six months previously. A cut-off of three months was taken as Weinman, Petrie, Moss-Morris and Horne (1996) have suggested that within the first three months following a cardiac event, illness representations are quite unstable, as the patient's view of the illness changes from seeing it as being an acute condition to a more chronic condition.

Participants were recruited from two groups:

1.) People born in the Punjab area (now divided between Pakistan and India) and presently living in the UK.

2.) Caucasians who were born and grew-up in the UK or Ireland.

Exclusion criteria included illiteracy in both English and Punjabi, the presence of another serious medical condition and pregnancy, as it was felt that this may affect their view of their heart disease.

Socioeconomic status was classified in accordance with the Registrar-General's Classification (Office of Population Census and Survey, 1991). This classifies occupations into seven socioeconomic groups: professional, managerial, skilled non-manual, skilled manual, partly skilled, unskilled and economically inactive. For the purpose of this study, participants who were retired or on sick leave, were classified according to their previous profession.

In consultation with a consultant cardiologist, amount of prescribed angina-related medication was taken as a measure of CHDseverity.

In total, 91 participants were recruited, 47 Punjabis and 44 Caucasians, 30 of whom were female and 61 were male. Of the Punjabi participants, 37 were recruited from the cardiology clinic and 10 from the Gurdwara, 12 completed a Punjabi translation of the questionnaires. The age range was 36-64 years (mean 55.3 yrs.; sd 7.8 yrs.). Seventeen participants had had a major cardiac event in the last three to six months, whilst 47 participants had experienced one or more major cardiac events during their life.

2.4. Translation Procedures

The researcher was unable to locate Punjabi versions of any of the questionnaires, despite personal communication with a number of prominent researchers in the respective areas (Jenkinson, Oxford; Weinman, London; Ghuman, Aberystwyth; Carver, USA; Mumford, Leeds). Therefore, all the questionnaires, the information sheet and consent form were translated into Punjabi. The translation procedure followed Bullinger's (1997) recommendations, in that two translators who were fluent in both English and Punjabi, and conversant with both cultures, forward translated the questionnaires independently. They then met with the researcher to discuss and critically review each others translation. This discussion addressed issues of semantic, content and conceptual equivalence and reliability of the translations (Flaherty et al., 1988) and resulted in the production of a third translation of the questionnaires. This was then back translated from Punjabi into English, by a translator who was blind to the original questionnaires. The back translations and originals were compared and discussed by all three translators and the researcher. This led to slight modification being made to the translations. (See appendix 2 for back translations).

2.5. Demographic Information

A background information sheet (appendix 3) was completed verbally with participants. This provided data on age, gender, ethnicity, educational level, most recent occupation, medication, duration of CHD and history of major cardiac events. If participants recruited from the cardiology clinic were unsure of

their cardiac history or medication, permission was sought from participants to ascertain this information from their medical notes.

2.6 Questionnaires

2.6.1 Illness Perception Questionnaire (IPQ)

(Weinman et al., 1996).

The IPQ (appendix 4) is a self-report scale developed to measure illness representation in a variety of conditions and has been adapted for use with participants with CHD. The items were theoretically derived to assess each of the five illness representation components: identity, cause, timeline, consequences and cure/control.

This scale was chosen because it is the only questionnaire available that is theoretically driven by Leventhal et al.'s (1992) self-regulatory model. It has also been standardised in a number of large studies, including people with CHD (Petrie et al., 1996; Weinman et al., 1996) and has established psychometric properties. The internal consistency of the scales (on data collected from renal and post-MI participants) ranged from 0.71 to 0.81 and test-retest reliability ranged from 0.49 to 0.84 at one month and 0.33 to 0.60 at three months, which were significant at $p<0.01$ (Weinman et al., 1996). No test-retest data were quoted for the cause items.

The first twelve questions of the IPQ form the illness identity scale. Participants rated the frequency of symptoms they

experienced as part of their illness, on a four-point scale from "all the time" to "never". The symptoms were pain, nausea, breathlessness, weight loss, fatigue, stiff joints, sore eyes, headaches, upset stomach, sleep difficulties, dizziness and loss of strength. The scores (ranging from 0= never to 3= all the time) were then summed to give a weighted illness identity score.

In the second half of the questionnaire, participants were required to rate their level of agreement with particular statements concerning their illness, on a five-point Likert scale ranging from "strongly disagree" to "strongly agree". The first ten items related to perceived cause of their heart condition, the next three examined perceived timeline of their heart condition, followed by seven items related to perceived consequences of having a heart condition and six items related to perceived control over or cure of their heart condition.

In addition, based on previous research findings, informal discussions with Punjabis with CHD and in consultation with the principal author of the questionnaire, additional items were added to the IPQ to increase its sensitivity to aspects of having CHD which may be culturally specific. These included five items related to the cause of their heart condition. The new causal factors were: "work-related stress"; "family-related stress"; "weak constitution"; "climate"; "fate" (IP27-IP30, IP32). One item related to the perceived consequences that their CHD had had on their role in the family (IP34) and one item related to belief that changes in their diet would improve their CHD (IP33) (control/cure dimension).

Following piloting of this modified IPQ with six Punjabi participants, a further two items were added to the questionnaire, one included the causal factor of "hard life" (IP31), whilst the other related to the perceived consequences that CHD had had on their position in the community (IP35).

In all, nine additional items were added to the original questionnaire. Additional items were added at the end of the questionnaire to maintain its psychological set. The final questionnaire contained 46 items, of which 12 items related to the illness identity dimension, 16 items related to the cause dimension, three related to the timeline dimension, nine items related to the perceived consequences dimension and seven item related to the control/cure dimension. The new items and the item "recovery from my heart condition is largely dependent on chance or fate" were explored individually and (where appropriate) were also included within their respective scales.

On the final 35 items of the questionnaire, the scores allocated to each item ranged from one to five. For the majority of statements "strongly agree" was allocated five points and "strongly disagree" one point. However, for five statements the scoring was reversed (IP11, IP16, IP17, IP23 & IP25). Following reverse scoring for relevant statements, the sum of the scores of the consequences, control/cure and timeline scales were totaled and divided by the number of items in that scale. The cause items were scored individually as each item "represents a specific causal belief" (Weinman et al., 1996).

In summary, the IPQ yielded the following measures:

1. Weighted illness identity score ranging from 0-36 (high scores indicated increased symptom frequency)

2. Illness cause scores, ranging from one to five, for each of the following: germ or virus, pollution, hereditary, chance, stress, own behaviour, other people, poor medical care, state of mind, work-related stress, family-related stress, weak constitution, climate, hard life and fate. High scores indicated greater belief in factor as causative.

3. Illness timeline score from one to five. High scores indicated longer perceived duration of heart condition.

4. Illness consequences score from one to five. High scores indicated greater perceived consequences of having a heart condition.

5.) Illness control/cure score from one to five. High scores indicated a greater perception of control over their heart condition or belief that it will be cured.

6.) Scores ranging from one to five for the following items:

a.) "Changes in my diet will improve my heart condition";

b.) "My heart condition has led to difficulties in my role in the family";

c.) "My heart condition has strongly affected my position in the community";

d.) "Recovery from my heart condition is largely dependent on chance or fate".

High scores indicated greater belief in item for all statements except (d.), where scoring was reversed.

2.6.2 COPE Questionnaire

(Carver et al., 1989).

The COPE (appendix 5) is a sixty item self-report scale designed to measure the coping strategies that people employ in response to a specific situation or during a specific time period (situational coping) and/or in response to typical stressors (dispositional coping). It was chosen for this study, as it assesses a wide variety of coping responses, is theoretically based and has previously been used in studies of illness representation (Moss-Morris et al., 1996). The dispositional version of the COPE was deployed, as there was not a uniform specific stressor for all the participants (e.g. not all participants had had a MI). However, participants were told to think about the questionnaire in relation to how they cope with their heart condition and any symptoms they may experience from it.

The COPE consists of 15 conceptually distinct scales, each scale has four items in the questionnaire measuring a particular type of coping strategy. The scales are as follows: active coping; planning; seeking instrumental social support; suppression of competing activities; restraint coping; seeking emotional social support; turning to religion; positive reinterpretation and growth; denial; acceptance; focusing on and venting of emotions; behavioural disengagement; mental disengagement; alcohol/drug use and humour. The alcohol/drug use and humour scales have not been fully validated.

Respondents rated how much they used each of the strategies on a four point scale, from one="I don't do this at all" to four= "I usually do this a lot". Separate scores for each of the scales were computed by adding the scores on the four items that make up each scale. Therefore, scale scores ranged from four to 16. Higher values indicated a more frequent use of the coping strategy.

Carver et al. (1989) have reported that the internal consistency of the COPE scales exceeded 0.6, with the exception of the mental disengagement scale (no data were available for alcohol/drug use and humour scales). Test-retest reliability of the scales (not including the humour scale) obtained from two samples of participants over a six and eight week period, ranged from 0.42-0.89 for the different scales.

The intercorrelations of the scales were reported as being weak (Carver et al., 1989), suggesting that the scales are measuring different aspects of coping. The scales also tended to cluster into strategies which theoretically may be considered adaptive and less adaptive.

2.6.3 Hospital Anxiety and Depression Scale (HAD)

(Zigmond & Snaith, 1983).

The HAD (appendix 6) is a 14 item self-report scale designed to measure anxiety (7 items) and depression (7 items).

It was chosen for this study because it was designed for use in medical out-patient clinics, as contamination by reports of

physical symptomatology is kept to a minimum. The HAD has also previously been used with patients with CHD (Shiell & Shiell, 1991) and an Urdu version has been shown to measure satisfactorily levels of depression and anxiety in a South Asian population (Mumford, Tareen, Bajwa, Bhatti & Karim, 1991).

Respondents were asked to rate each item on a four-point scale measuring severity or frequency of particular symptoms. Each item was scored from zero to three and summed to yield separate anxiety and depression scores, ranging from zero to 21. Higher scores indicated greater levels of depression or anxiety. Zigmond and Snaith (1983) have suggested, based on a study of 100 medical out-patients, that a score of seven or below on each scale indicates a non-case, scores of eight to ten indicates a doubtful or borderline case and scores of eleven or above indicate a definite case.

The internal consistency of the HAD has been reported as being 0.93 for the anxiety scale and 0.90 for the depression scale (Moorey, Greer, Watson, Gorman, Rowden, Tunmore, Robertson & Bliss, 1991). Concurrent validity has been established using interview based ratings of anxiety and depression (Zigmond & Snaith, 1983). Moorey et al. (1991) have examined the construct validity of the scale. Principal-components analysis extracted two independent factors which accounted for 53 percent of the variance. In each case, items loaded as expected, with the exception of item seven which loaded on both factors.

The measures used in the present study were anxiety and depression scores, as well as the cut-offs for anxiety and depression caseness. These were reclassified as ten or below indicating non/borderline case and above ten indicating a definite case.

2.6.4 Short Form 36 Health Survey Questionnaire (SF36)

(Ware, Snow, Kosinski & Gandek, 1993).

The SF36 (appendix 7) was designed to measure perceived health status. It was chosen for this study as it covers a wide range of areas that may be adversely affected by illness, whilst not being too cumbersome for participants. It has also been used successfully with people with angina and who have had a MI (Lyons, Lo & Littlepage, 1994). The physical functioning scale in particular was chosen, as it has been shown to be the most valid measure within the questionnaire of the physical component of health status (Ware, Gandek & the IQOLA Project Group, 1994).

The questionnaire consists of 36 items which measure nine dimensions of health: physical functioning (10 items); role limitations due to physical problems (4 items); role limitations due to emotional problems (3 items); social functioning (2 items); mental health (5 items); energy/vitality (4 items); pain (2 items), general health perception (5 items) and change in health (1 item).

The scales are either forced choice "yes" or "no", (role limitations due to emotional and physical problems), or Likert scales ranging from three points (physical functioning), to five points (change in

health, general health perception and one of the social functioning and pain scales) and six points (mental health, energy/vitality and the remaining social functioning and pain scales). For each health concept, item scores were coded, summed and transformed onto a scale from zero to 100. The higher the score, the better the level of perceived health status.

Data on the internal consistency of the UK version of the questionnaire have been reported by Jenkinson, Layte, Wright and Coulter (1996). High Cronbach alpha values (over 0.8) were gained for all the dimensions, except for the social functioning scale (alpha= 0.76). Test-retest reliability scores at two weeks, have also been reported as high (Brazier, Harper, Jones, O'Cathain, Thomas, Usherwood & Westlake, 1992). Evidence has been provided for the criterion validity of the SF36, using the general health perception item as the criterion against which the other items were tested (Jenkinson, Wright & Coulter, 1994). Construct validity has also been reported as good (Brazier et al., 1992).

2.6.5. Acculturation Scale

(Ghuman, 1975)

The acculturation scale is a self-report questionnaire designed to measure degree of acculturation in British South Asian adolescents. Items are in the domain of food, clothes, the role of women, religion, entertainment and community life. Fourteen items sample opinions on South Asian culture and 16 items are related to British culture. Validation data has been reported based on 465 South Asian participants aged between 13 and 15 years

(Ghuman, 1991). The internal reliability of the questionnaire for split-half was 0.83 (Spearman-Brown) and the Cronbach alpha was 0.78. The reliability index did not fall below 0.75 for any of the subsamples analysed.

Unfortunately, this questionnaire was designed for adolescents and the researcher was unable to locate a well-designed questionnaire measuring acculturation in British South Asian adults. The questionnaire was therefore modified to make it more suitable for an adult population. This involved including a more detailed introduction, slight alteration to the wording on seven of the questions (e.g. "girls and boys" changed to "women and men") and the removal of two items (one referring to "school dinners" and the other referring to "youth clubs"). In the new version, 14 items sampled opinion on Asian culture and 14 sampled opinion on British culture. (Appendix 8 and 9, for old and new versions of the questionnaire, respectively.)

The questionnaire involved participants rating their agreement with each statement on a five-point Likert scale (strongly agree to strongly disagree). On statements expressing sympathy for British culture (items 1, 2, 4, 5, 9, 14, 15, 16, 18, 20, 22, 25, 26 ,28), scoring was from five= strongly agree to one= strongly disagree. The remaining items expressed sympathy for Asian culture and the scoring was reversed. Item scores were summated to give an overall score ranging from 28-140. The higher the score the greater the degree of acculturation to British culture.

2.7 Procedure

Two pilots were run of the study. To begin with, the English version of the questionnaires was piloted with six Punjabi participants. The aim of this pilot was firstly to improve the cultural sensitivity of the IPQ by obtaining feedback as to whether the Punjabi participants felt that all the relevant areas had been covered. This led to further items being added. The second aim was to pilot the questionnaires with Punjabis, as three of the questionnaires have not previously been used with this group.

A second pilot with six Punjabi participants, was undertaken of the Punjabi version of the questionnaires. None of the participants reported any difficulties with the questionnaires and no further modifications were undertaken.

The study was conducted at two sites:

1. The researcher attended 24 cardiology clinics at a teaching hospital. Potential participants were approached whilst they were waiting for their routine cardiology clinic appointment. A verbal explanation and an information sheet (appendix 10) outlining the project were given. Participants who were initially interested in the study were given time to read the information sheet, after which they were asked whether they had any questions. Once all their questions had been answered, participants were asked whether they consented to take part in the study. If they agreed, the consent form (appendix 11) was completed.

Background information was obtained verbally from the participants as it was thought that this was a more sensitive way of obtaining this information. Permission was sought from the participants to contact their GP to inform them of their involvement in the study, in order to meet the requirements of the hospital's ethics committee.

The researcher then gave the Caucasian participants four questionnaires (IPQ, COPE, SF36, HAD) to complete whilst in the waiting room. Punjabi participants were also given the acculturation questionnaire and the option of completing the Punjabi translation of the questionnaires. The questionnaires were given in a random order (counterbalanced) to control for fatigue effects and they took 20-45 minutes to complete. For those wishing to complete the questionnaires at home (n=9), a stamped addressed envelope was provided (5 were returned).

2. The researcher also attended a health promotion day held in a Gurdwara. This day was organised by the Council of Sikh Gurdwaras for that area and was aimed at Sikhs (mainly of Punjabi origin) with either diabetes, CHD or cerebrovascular disease. The health promotion day was attended by nurses, a doctor and dieticians, who gave advice on ways to help manage these conditions and improve health.

The researcher firstly contacted the committee to present and discuss the research proposal. The committee granted approval for the research to be undertaken during the health promotion day

and permission was gained to conduct the research from the appropriate ethics' committee.

It was arranged that the doctor present at the health promotion day, would initially approach potential participants whom he had verified had CHD. Those potential participants who expressed an interest in participating in the research, then met with the researcher who gave them a verbal explanation of the study and an information sheet (appendix 12). The recruitment process was then the same as in the cardiology clinic. All the participants completed the questionnaires whilst in the Gurdwara.

At both sites, it was stressed throughout the process that participation in the study was completely voluntary and that participants may withdraw at any stage.

2.7.1 Debriefing of Participants and Handling Clinical Issues

All the questionnaires used were designed to be completed by the general public and to the best of the researcher's knowledge, no untoward effects have been reported from their use. However, in the unlikely event of this occurring, it was planned to allow time for participants to talk their feelings through and if necessary with their permission, to contact their GP.

In particular, it was felt by the researcher and also raised by the ethics committees that the acculturation questionnaire may potentially upset participants. Therefore, once participants had

completed the questionnaires, they were asked by the researcher how they had found filling them in and whether they had raised any issues for them. Particular attention was given to the acculturation questionnaire where appropriate. Participants were also informed on the information sheet, that they may contact the researcher if they had any concerns and there was space for comments about the study on the final sheet attached to the questionnaires (appendix 13). However, no participants reported either verbally or in the comments section, finding the acculturation questionnaire or any of the other questionnaires upsetting. Participants were also asked on the final sheet, whether they would like a copy of a report of the study.

2.8 Statistical Analysis

The study generated a mixture of ordinal, nominal and plastic interval data. Nominal data included gender, ethnicity, past history of cardiac events, socioeconomic status, and anxiety and depression caseness. However, most of the data, such as coping scores were plastic interval (Coolican, 1994).

Levene's test of homogeneity of variance and Kolomogorov-Smirnov's test for a normal distribution were used to assess the suitability of parametric analysis on all except the nominal data. Histograms were also plotted. The results indicated that in the majority of cases there was homogeneity of variance across the groups (appendix 14) and that the data were normally distributed within each group (appendix 15). It was noted that some variables did not meet all the criteria for parametric analysis, however

given that the majority of variables met the criteria and that there was a similar number of participants within each ethnic group, it was decided to cautiously use parametric analysis. However, for variables in which parametric conditions were not met, any significant differences were checked using non-parametric tests. Non-parametric tests were also used for nominal and ordinal data, and where number of participants was small.

Data analysis involved a number of stages. The reliability of the measures for the different groups was established using Cronbach alpha statistics. Demographic statistics were produced and the ethnic groups compared. Preliminary analysis was undertaken to verify that data could be combined from the different gender groups, the different cardiac history groups and the subgroups within the Punjabi group.

Independent t-tests and chi square tests were used to compare ethnic groups on all measures. Pearson's co-efficients were used within the Punjabi group to determine the association between acculturation and study measures, as well as the association between:

a.) illness representations and coping strategies, perceived health status, anxiety and depression;

b.) coping strategies and perceived health status, anxiety and depression.

Scattergrams were plotted to check for outlying values

Significant results involving variables that did not fulfil parametric conditions were checked using non-parametric tests (Mann-Whitney tests, Spearman correlations).

Finally, significant correlations at the univariate level for both ethnic groups, were entered into a series of multiple regressions to examine the relative contributions of ethnicity, illness representations and coping responses to physical functioning, anxiety and depression. Residuals were analysed to check for outlying values, and P-P plots and scatterplots were performed to check that the assumptions of linearity and homogeneity of variance had been met.

All analyses were carried out using the statistical package for social science for windows, version 6.1 (SPSS Inc, 1993). In view of the number of tests employed, it was decided to set the statistical significance level for the majority of the analysis, at $p \leq 0.01$. However, for stage seven, as over 100 correlations (but below 250) were deployed in one set of analysis, a more stringent significance level of $p \leq 0.004$ was used.

The majority of the statistical analyses were based on two tailed hypotheses. However, one tailed hypotheses were used for some comparative tests between ethnic groups where direction of results was predicted.

3. RESULTS

The results are presented in the following order:

3.1 Internal reliability analysis of questionnaires.

3.2 Demographic characteristics of participants

3.3 Preliminary analysis

3.4 Comparisons between ethnic groups on all measures

3.5 Univariate tests of association within the Punjabi group between acculturation and demographic indices, illness representations, coping strategies, perceived health status, anxiety and depression.

3.6 Univariate tests of association within Punjabi group between illness representations and coping strategies, perceived health status, anxiety and depression.

3.7 Univariate tests of associations within Punjabi group between coping strategies, and perceived health status, anxiety and depression.

3.8 Relative contributions of ethnicity, illness representations, and coping strategies to perceived physical functioning, anxiety and depression.

Significance level, unless otherwise specified, are quoted at the $p \leq 0.01$, one or two tailed.

3.1 Reliability of Measures

The internal reliabilities of the IPQ, COPE, SF36, HAD and acculturation scales were examined for three main groups: Punjabi participants who completed the English version of the questionnaires; the Caucasian group; Punjabi participants who completed the Punjabi translation of the questionnaires. These analyses revealed that the internal reliabilities of the original IPQ scales were 0.60 or above for all three groups. After the new items had been added to the control/cure and consequences scales, the internal consistency of the control/cure scale had improved for all three groups and the consequences scale had improved for all but the Punjabi version of the questionnaire, where there was a slight fall in its level of consistency. The additional items resulted in all the IPQ scales having a consistency above 0.67 (appendix 16).

The internal consistency of five of the COPE scales fell below 0.60 for either the Caucasian or Punjabi group (English version). These were dropped completely from the study. A further four Punjabi translations of scales were dropped (although the English version remained in the study) as their internal consistency fell below the 0.60 mark (table 1).

Table 1: Internal Consistency of COPE

Variable	Punjabi group (English version)	Caucasian Group	Punjabi Group (Punjabi version)
Active Coping *	0.44	0.73	0.42
Planning	0.73	0.77	0.68
Seeking instrumental social support	0.82	0.69	0.72
Seeking emotional social support	0.74	0.68	0.78
Suppression of competing activities*	0.56	0.40	0.44
Turning to religion §	0.86	0.96	0.54
Positive reinterpretation §	0.68	0.73	0.30
Restraint coping *	0.34	0.59	0.37
Acceptance	0.60	0.60	0.73
Focus on/venting of emotions §	0.69	0.74	0.54
Denial *	0.33	0.71	0.29
Mental disengagement *	0.13	0.16	0.48
Behavioural disengagement	0.63	0.61	0.73
Alcohol/drug use §	0.88	0.95	0.46
Humour	0.79	0.90	0.75

* =scales dropped completely from the study, § =Punjabi translation of scales dropped from the study

The internal reliabilities of the SF36, HAD and acculturation scale were acceptable for all three groups except for the Punjabi translation of the HAD depression scale which had an internal consistency of 0.57. However, it was decided to keep this scale within the study, as it was approaching the cut-off and due to its importance as an outcome measure. Results involving this questionnaire must therefore be interpreted cautiously (see appendix 17 for full results).

3.2 Demographic Characteristics of Participants

There were more men than women, and the majority of participants had not had a major cardiac event within the last three months. There was a fairly even divide between those who had never experienced a major cardiac event and those who had experienced either a MI, CABG or angioplasty. Within the Punjabi

group, there were a number of people who had no or minimum education. However, the mode education level was six to ten years for both groups. The number of participants within each socioeconomic group was also similar across ethnic groups, although the Punjabi group notably had more people who were economically inactive. The mode occupation for both groups was skilled manual. Table 2 summaries the sample's demographic characteristics and demonstrates that there were no significant ethnic differences.

To increase numbers within socioeconomic groups for subsequent analyses, this variable was reclassified into two groups: one group consisting of professional, managerial and skilled non-manual occupations (non-manual group) and the other consisting of skilled manual, partly skilled and unskilled occupations, as well as those economically inactive (manual group).

Table 2: Demographic Characteristics of Participants

Variable	Punjabi Group	Caucasian Group	Statistic	Sig.
Gender (male:female)	33:14	28:16	0.45 (Chi-square value)	0.505 (df=1)
Age: mean (s.d.)	53.77 yrs. (8.34)	56.89 yrs. (6.89)	-1.94 (t-value)	0.056 (df=89)
Socioeconomic status:			4.36 (Chi-square value)	0.629 (df=6)
Professional	5	6		
Managerial	4	9		
Skilled (non-manual)	8	9		
Skilled (manual)	9	10		
Partly skilled	7	6		
Unskilled	1	2		
Economically inactive	6	2		
Education:			934.5 (Mann Whitney U)	0.918 (n=91)
None	5	0		
1-5 years	6	0		
6-10 years	12	27		
11-15 years	10	11		
16-20 years	8	4		
>20 years	3	1		
Recent Cardiac History:			0.19 (Chi-square value)	0.979 (df=3)
MI (3-6mos previously)	4	4		
CABG (3-6mos previously)	3	2		
Angioplasty (3-6mos prev.)	2	2		
Angina but no recent major cardiac event	36	36		
Past History of Cardiac events:-			0.56 (Chi-square value)	0.454 (df=1)
Never experienced major cardiac event (angina only)	23	19		
Experienced one or more major cardiac events	22	25		
Duration of CHD mean (s.d.)	28.75 mos (30.94)	33.38 mos (40.00)	-0.58 (t-value)	0.565 (df=78)
Amount of angina-related medication: mean (s.d.)	2.85 (1.20)	2.95 (1.02)	-0.41 (t-value)	0.681 (df=82)

3.3 Preliminary Analysis

3.3.1 Within the Group as a Whole

Data from participants who had experienced either a MI, CABG or angioplasty were combined due to the small numbers and as

previous research has reported no significant differences in illness representations between these three groups (Cooper, in press).

Comparative tests were used to explore whether there were differences on the study measures, between those who had or did not have a history of major cardiac events. Participants who had experienced past cardiac events were significant less in agreement that their heart disease had been caused by having a hard life ($t=3.05$, $p=0.003$) or by a germ/virus ($t=2.76$, $p=0.007$). This group also reported significantly more use of positive reinterpretation and growth as a coping strategy ($t=-2.52$, $p=0.01$).

Comparisons between the gender groups revealed that women had significantly higher illness identity scores ($U=487.0$, $p=0.0003$), poorer general health perception ($U=596.0$, $p=0.010$) and poorer physical functioning ($U=479.5$, $p=0.0002$). They were also less likely to perceive work stress as having a causal role in their heart condition ($U=619.0$, $p=0.010$).

Given the small number of differences between these groups, in relation to the number of variables included in the study (see appendices 18 and 19), data were combined for further analyses.

3.3.2 Within the Punjabi Group.

Preliminary analysis revealed that the only significant difference between those Punjabi participants who had completed the Punjabi translation of the questionnaires and those who had completed the English version, was that a higher ratio of women

completed the Punjabi version (Chi-square value=10.48, p=0.001, df=1) (appendix 20).

Comparisons between Punjabi participants recruited from the Cardiology clinic compared to those recruited from the Gurdwara, revealed that those recruited from the Gurdwara, had had CHD for longer (U=46.5, p=0.006), were less acculturated (U=80.0, p=0.008) and more frequently cited use of humour as a coping strategy (U=63.5, p=0.008) (appendix 21).

3.4 Comparative Tests between Ethnic Groups

As there appeared to be few differences between the Punjabi subgroups, it was decided to combine their data on all measures which had satisfactory internal consistency, except use of humour as a coping strategy. For this variable, only the Punjabi clinic group data were included for comparative tests with the Caucasian group.

3.4.1 Illness Representations

Independent t-tests were used to compare ethnic groups on each of the IPQ measures (table 3).

Table 3: Mean scores and results from t tests comparing ethnic groups on IPQ

Variable	Punjabi Group (s.d.)	Caucasian Group (s.d.)	t value	sig.	d.f.
IPQ:					
Identity	10.68 (6.11)	11.45 (4.47)	-0.69	0.495	89
Consequences	3.39 (0.70)	3.15 (0.73)	1.54	0.126	87
Control	3.57 (0.59)	3.58 (0.60)	-0.10	0.919	89
Timeline	3.28(1.05)	3.78 (0.80)	-2.52	0.014*	89
Germ/virus	2.47 (1.18)	1.68 (0.74)	3.84	0.0001*	78.15
Diet §	3.32 (1.16)	3.02 (1.21)	1.19	0.119	89
Pollution	2.77 (1.18)	2.27 (1.07)	2.09	0.040	89
Hereditary	2.72 (1.23)	3.27 (1.32)	-2.06	0.043	89
Chance	3.30 (1.21)	2.68 (1.14)	2.49	0.014*	89
Stress	3.37 (1.20)	3.55 (1.09)	-0.71	0.481	81
Own behaviour	2.68 (1.11)	3.05 (1.20)	-1.51	0.135	89
Other people	2.53 (1.00)	2.43 (1.11)	0.45	0.221	89
Poor medical care	2.49 (1.16)	1.82 (0.92)	3.04	0.003*	89
State of mind	2.81 (1.26)	2.07 (1.11)	2.97	0.004*	89
Work stress §	3.02 (1.21)	3.14 (1.32)	-0.43	0.333	89
Family stress §	2.96 (1.25)	2.67 (1.24)	1.14	0.128	89
Weak constitution §	2.70 (1.06)	1.98 (0.70)	3.87	0.0001*	80.07
Climate §	2.68 (1.13)	1.93 (0.73)	3.79	0.0001*	79.38
Hard life	2.94 (1.11)	2.25 (0.97)	3.13	0.002*	89
Fate §	3.11 (1.18)	2.18 (1.04)	3.95	0.0001*	89
Changes in my diet will improve CHD §	3.94 (0.79)	3.93 (0.85)	0.03	0.490	89
Difficulties in role in family §	3.55 (1.27)	2.75 (1.18)	3.12	0.001*	89
Affected position in community	2.84 (1.19)	2.30 (1.09)	2.27	0.026	87
Recovery dependent on chance or fate §[3]	3.09 (1.33)	3.98 (1.07)	-3.51	0.0005*	89

*significance $p \leq 0.01$, §= one-tailed hypothesis

There were significant differences between ethnic groups in illness timeline, such that the Caucasian group perceived that their heart disease would last significantly longer than the Punjabi group. The Punjabi group were significantly more in agreement that the following factors had played a causal role in their heart condition: a germ/virus, poor medical care, chance, state of mind, weak constitution, climate, hard life and fate. They also agreed more that having a heart condition had led to difficulties in their

[3] The scoring for this item has been reversed, therefore lower scores indicate increased agreement with this statement.

role in the family and that recovery was dependent on chance or fate.

3.4.1.1 Illness Identity

Table 4 demonstrates the percentage of participants within each ethnic group who cited the symptoms as part of their heart condition.

Table 4: Percentage of Punjabi and Caucasian Participants experiencing symptoms as part of their heart condition.

Symptom	Punjabi group (n=47)	Caucasian Group (n=44)
Pain	40 (85.1%)	41 (93.2%)
Nausea	17 (36.2%)	17 (38.6%)
Breathlessness	35 (74.5%)	37 (84.1%)
Weight loss	12 (25.5%)	6 (13.6%)
Fatigue	36 (76.6%)	37 (84.1%)
Stiff joints	29 (61.7%)	33 (75%)
Sore eyes	22 (46.8%)	21 (47.7%)
Headaches	25 (53.2%)	29 (65.9%)
Upset stomach	26 (55.3%)	29 (65.9%)
Sleep difficulties	34 (72.3%)	31 (70.5%)
Dizziness	27 (57.4%)	33 (75%)
Loss of strength	34 (72.3%)	31 (70.5%)

For both groups, the most frequently reported symptom was pain, and weight loss was the least reported symptom.

3.4.1.2 Causal Items

The scores for the causal items of the IPQ were treated separately. Data were examined to see the number of participants who strongly agreed/agreed or were uncertain/disagreed/strongly disagreed that a factor was a causal contributor to their heart condition. Number of participants within each sub-category are given in table 5.

Table 5: Number of participants citing the factor as a cause of their heart condition

	Punjabi Group (n=47)		Caucasian Group (n=44)	
Cause	Agree with factor	Uncertain /disagree with factor	Agree with factor	Uncertain /disagree with factor
Germ/ virus	9 (19.1%)	38 (80.9%)	0	44 (100%)
Diet	25 (53.2%)	22 (46.8)	18 (40.9%)	26 (59.1)
Pollution	14 (29.8%)	33 (70.2%)	6 (13.6%)	38 (86.4%)
Hereditary	15 (31.9%)	32 (68.1%)	25 (56.8%)	19 (43.2%)
Chance	25 (53.2%)	22 (46.8%)	13 (29.5%)	31 (70.5%)
Stress*	26 (60.5%)	17 (39.5%)	22 (55.0%)	18 (45.0%)
Own behaviour	13 (27.7%)	34 (72.3%)	16 (36.4%)	28 (63.6%)
Other people	8 (17%)	39 (83%)	8 (18.2%)	36 (81.8%)
Poor medical care	10 (21.3%)	37 (78.7%)	3 (6.8%)	41 (93.2%)
State of mind	18 (38.3%)	29 (61.7%)	4 (9.1%)	40 (90.9%)
Work stress	19 (40.4%)	28 (59.6%)	20 (45.5)	24 (54.5%)
Family stress	17 (36.2%)	30 (63.8%)	12 (27.3%)	32 (72.7%)
Weak constitution	13 (27.7%)	34 (72.3%)	0	44 (100%)
Climate	11 (23.4%)	36 (76.6%)	1 (2.3%)	43 (97.9%)
Hard life	17 (36.2)	30 (63.8%)	6 (13.6%)	38 (86.4%)
Fate	19 (40.4%)	28 (59.6%)	7 (15.9%)	37 (84.1%)

* Numbers reduced due to missing values

For the Punjabi group, "stress" was the most frequently cited cause of their heart condition, whilst for the Caucasian group, it was "hereditary". The mean number of causal items reported as playing a role in their heart condition was 5.63 (sd=2.80) for the Punjabi group and 3.78 (sd=2.22) for the Caucasian group, which was a significant difference (t-value=3.32, p=0.001, df=81).

3.4.2 Coping

The only significant ethnic difference in coping strategies, was that the Punjabi group more frequently cited use of turning to religion (table 6). This difference still remained significant after excluding participants recruited at the Gurdwara (t-value=5.69, p=0.0001, df=70).

Table 6: Mean scores and results from t tests comparing ethnic groups on COPE scales

Variable	Punjabi Group (s.d.)	Caucasian Group (s.d.)	t value	sig.	d.f.
Planning	10.71 (3.18)	10.59 (3.19)	0.18	0.854	81
Seeking instrumental social support	10.00 (3.13)	9.80 (3.27)	0.28	0.782	81
Seeking emotional social support	9.38 (3.22)	8.76 (3.11)	0.90	0.371	81
Acceptance	10.83 (2.78)	10.85 (3.01)	-0.03	0.975	81
Behavioural disengagement	7.45 (3.05)	6.68 (2.79)	1.20	0.234	81
Humour§	6.61 (2.69)	8.20 (3.63)	-2.09	0.040	72
Analyses only include data from the English version of questionnaires					
Positive reinterpretation	11.13 (2.81)	10.83 (2.98)	0.43	0.668	71
Turning to religion	12.16 (3.73)	6.61 (4.27)	5.81	0.0001*	71
Alcohol/drug use	5.06 (2.21)	5.17 (2.63)	-0.19	0.848	72
Focus on/venting of emotions	9.38 (3.16)	8.27 (3.11)	1.50	0.138	71

§Analysis does not include data from Gurdwara recruited participants
*significance $p \leq 0.01$

3.4.3 Perceived Health Status and Psychological Adjustment

Tables 7 and 8 show that the only significant ethnic difference on perceived health status and psychological adjustment measures, was that the Punjabi group reported significantly more depressive symptoms.

Table 7: Mean scores and results from t tests comparing ethnic groups on perceived health status measures, and anxiety and depression levels.

Variable	Punjabi Group (s.d.)	Caucasian Group (s.d.)	t value	sig.	d.f.
Change in health	45.74 (27.25)	41.48 (25.83)	0.77	0.446	89
Energy/ vitality	50.11 (20.75)	44.55 (17.48)	1.37	0.173	88
General health perception	49.57 (21.18)	45.80 (18.36)	0.90	0.370	88
Mental health	65.74 (19.68)	68.36 (19.65)	-0.63	0.528	88
Pain	57.45 (27.05)	58.33 (26.81)	-0.16	0.876	89
Physical functioning	51.28 (22.64)	52.05 (28.29)	-0.14	0.886	89
Role limitations due to emotional problems	39.01 (44.68)	51.51 (44.00)	-1.34	0.182	89
Role limitations due to physical problems	22.34 (36.58)	35.80 (41.90)	-1.63	0.106	89
Social functioning	60.14 (29.40)	65.15 (33.26)	-0.76	0.451	88
HAD Anxiety	8.38 (4.02)	7.83 (3.81)	0.66	0.511	86
HAD Depression	7.64 (4.09)	5.07 (3.64)	3.09	0.003*	86

*significance $p \leq 0.01$

Table 8: Results of Chi-square tests for anxiety and depression caseness

	Punjabi Group	Caucasian Group	Chi square value	Sig.
HAD Anxiety			0.01 (df= 1)	0.931
Non/borderline case	34 (72%)	30 (73%)		
Definite case	13 (28%)	11 (27%)		
HAD Depression			4.24 (df= 1)	0.040
Non/borderline case	36 (77%)	38 (93%)		
Definite case	11 (23%)	3 (7%)		

3.4.4 Verification of Results

Mann-Whitney tests were used to check significant results involving variables which did not meet the conditions for parametric analysis. Significant differences between ethnic groups remained for all the variables, except perceptions that chance played a causal role in their heart disease, although this variable was significant at the 0.02 level (appendix 22). Therefore, the results for this variable must be interpreted cautiously.

3.5 Relationships within the Punjabi Group between Acculturation, and Demographic Indices and Study Measures

3.5.1 Correlations between Acculturation and Demographic Indices

Table 9 demonstrates that the only significant correlation was between socioeconomic status and acculturation, with the non-manual group being more acculturated.

Table 9: Correlations between acculturation and demographic indices (n=47)

Variable	Correlation co-efficient	significance
Gender	-0.30 Kendall's tau-c	0.023
Past cardiac history	0.33 Kendall's tau-c	0.044
Socioeconomic status	-0.42 Kendall's tau-c	0.011*
Education	0.32 Spearman	0.032
Amount of angina related medication	-0.08 Pearson	0.634
Length of time of CHD	-0.14 Pearson	0.403

*significance $p \leq 0.01$

3.5.2 Correlations between Acculturation and Illness Representations

Table 10 shows that there were significant correlations between attributing their heart condition to having had a hard life or to fate, and acculturation, such that increased belief in these causal factors was associated with being less acculturated. Similarly, increased belief that recovery was dependent on chance or fate was associated with being less acculturated.

Table 10: Pearson correlations between acculturation and illness representations (n=47).

Variable	Correlation co-efficient	Significance
Identity	-0.19	0.208
Consequences	0.13	0.386
Control	0.22	0.150
Timeline	0.19	0.207
Germ/Virus	-0.11	0.458
Diet	0.10	0.518
Pollution	0.16	0.298
Hereditary	0.20	0.191
Chance	-0.12	0.448
Stress	-0.02	0.898
Own behaviour	0.04	0.784
Other people	-0.14	0.352
Poor medical care	0.07	0.653
State of mind	-0.16	0.300
Work Stress	0.13	0.409
Family Stress	-0.17	0.268
Weak Constitution	-0.28	0.062
Climate	-0.32	0.029
Hard life	-0.40	0.006*
Fate	-0.37	0.011*
Changes in diet will improve CHD	0.22	0.151
Led to difficulties in role in family	0.06	0.704
Strongly affected position in community	-0.08	0.627
Recovery largely dependent on chance or fate 3 (refer to page 59)	0.36	0.013*

*significance $p \leq 0.01$

3.5.3 Correlations between Acculturation and Coping

Table 11 shows that for Punjabi participants who completed the English version of the questionnaires, there was a positive correlation between use of positive reinterpretation as a coping strategy and acculturation. Turning to religion was negatively correlated with acculturation, such that increased use of this coping strategy was associated with being less acculturated.

Table 11: Pearson correlation between acculturation and coping

Variable (n=47)	Correlation co-efficient	Significance
Planning	0.37	0.017
Seeking instrumental social support	0.07	0.658
Seeking emotional social support	0.08	0.617
Acceptance	0.16	0.324
Behavioural disengagement	-0.31	0.043
Humour	-0.08	0.638
English version of questionnaires only (n=35)		
Positive reinterpretation	0.54	0.001*
Turning to religion	-0.58	0.0001*
Alcohol/drug use	0.25	0.163
Focus on/venting of emotions	0.01	0.940

*significance $p \leq 0.01$

3.5.4 Correlations between Acculturation, and Perceived Health Status and Psychological Adjustment

Table 12 demonstrates that physical functioning was the only health status measure that was correlated with acculturation, such that better physical functioning was associated with increased acculturation. Neither of the psychological adjustment measures were correlated with acculturation.

Table 12: Pearson correlations between acculturation and perceived health status measures, and anxiety and depression levels (n=47)

Variable	Correlation co-efficient	Significance
Change in health	0.07	0.658
Energy/vitality	-0.03	0.839
General health perception	0.31	0.040
Mental Health	0.15	0.319
Pain	0.13	0.373
Physical functioning	0.44	0.002*
Role limitations due to emotional problems	-0.17	0.247
Role limitations due to physical problems	0.03	0.837
Social Functioning	0.10	0.524
HAD Anxiety	0.11	0.468
HAD Depression	-0.09	0.565

*significance $p \leq 0.01$

3.5.5 Verification of Results

Scattergrams indicated that none of the significant correlations were due to the influence of outlying values (appendix 23).

To check for a confounding effect of socioeconomic status, correlations were performed between socioeconomic status and variables significantly correlated with acculturation. The only significant association was between socioeconomic status and physical functioning ($r = -0.46$, $p = 0.005$) (appendix 24).

Correlations were also performed using only participants recruited from the clinic, as there was a significant difference in level of acculturation between Punjabi participants recruited in the Gurdwara and those recruited from the Cardiology clinic. All variables remained significant, except IPQ causal item "hard life" (appendix 25).

3.6 Univariate Tests of Association within Punjabi Group between Illness Representations, and Coping, Perceived Health Status and Psychological Adjustment

Due to the number of correlations a significance level of $p \leq 0.004$ was taken for this section of statistical analysis.

3.6.1 Correlations within Punjabi Group between Illness Representations and Coping

Pearson correlations revealed that there was a significant positive association between viewing other people as having a causal role

in their heart condition and seeking emotional social support (p=0.002). Turning to religion as a coping strategy was associated with both increased perception that fate was a causal factor in their heart condition (p=0.0001) and that recovery was dependent on chance or fate (p=0.004) (tables 13 and 14). See appendix 26 and 27 for p values.

Table 13: Correlations within Punjabi group between illness representations and coping (n=47)

Variable	Planning	IS	ES	Acceptance	BD	Humour
Identity	r= 0.40	r= 0.03	r= 0.03	r= -0.31	r= 0.01	r= -0.14
Consequences	r= -0.24	r= -0.07	r= -0.09	r= 0.11	r= -0.05	r= -0.39*
Control	r=0.002	r=-0.09	r=-0.24	r=0.18	r=-0.06	r=0.24
Timeline	r=-0.28	r=0.01	r= 0.14	r= 0.09	r= -0.18	r= -0.33
Germ/ virus	r= 0.10	r= 0.19	r= 0.18	r= -0.10	r= 0.24	r= -0.06
Diet	r= 0.10	r= -0.20	r= -0.37	r=0.11	r= -0.02	r= 0.14
Pollution	r= -0.02	r= 0.03	r= 0.28	r= -0.12	r= 0.02	r= 0.05
Hereditary	r= 0.02	r= -0.05	r= 0.02	r= -0.23	r= -0.20	r= -0.18
Chance	r= 0.08	r= 0.19	r=0.17	r= 0.02	r= 0.19	r= 0.10
Stress	r= -0.04	r= -0.35	r= 0.02	r= 0.18	r= 0.22	r= -0.01
Own behaviour	r= -0.06	r= -0.10	r=0.02	r= 0.08	r= 0.24	r= 0.17
Other people	r= 0.36	r= 0.31	r= 0.47**	r= -0.26	r= 0.11	r= -0.19
Medical care	r= 0.02	r= -0.01	r= 0.08	r= 0.004	r= 0.08	r= 0.05
State of mind	r= -0.003	r= 0.12	r= 0.05	r= -0.24	r= 0.06	r= -0.18
Work stress	r= 0.17	r= -0.05	r= 0.11	r= 0.06	r= -0.06	r= -0.13
Family stress	r= 0.26	r= 0.06	r= 0.19	r= -0.32	r= 0.04	r= -0.25
Weak constitution	r= 0.13	r= 0.25	r= 0.23	r= -0.28	r= 0.20	r= -0.08
Climate	r= 0.02	r= -0.06	r= 0.34	r= -0.19	r= 0.40*	r= 0.14
Hard life	r= 0.01	r= -0.02	r= -0.01	r= -0.21	r= 0.05	r= 0.03
Fate	r= -0.08	r= 0.07	r= 0.21	r= -0.14	r= 0.22	r= -0.16
Changes in diet will improve CHD	r= -0.01	r=-0.04	r= -0.22	r=0.30	r= -0.17	r=0.17
Led to diffs. in role in family	r= -0.09	r= -0.01	r= 0.07	r= 0.09	r= 0.14	r= -0.31
Affected position in community	r= -0.30	r= 0.01	r= -0.24	r= -0.17	r= -0.05	r= -0.32
Recovery dependent on chance or fate	r=0.12	r= -0.12	r= -0.12	r=0.14	r= -0.07	r=0.26

IS= seeking instrumental social support, ES= seeking emotional social support, BD= behavioural disengagement

*significance $p \leq 0.01$, **significance $p \leq 0.004$

Table 14: Continuation of correlations within Punjabi group between illness representations and coping (n=35). (For the following scales, participants who completed the Punjabi translation of the questionnaires were excluded).

	Turning to religion	Positive reinterpre-tation	Alcohol/ drug use	Focus on/ venting of emotions
Identity	r= 0.19	r= 0.15	r= 0.16	r= 0.19
Consequences	r= -0.28	r= -0.04	r= -0.02	r= -0.05
Control	r= -0.37	r=0.41	r=0.19	r=0.08
Timeline	r= -0.28	r=0.001	r=0.09	r=0.06
Germ/ virus	r= 0.09	r= 0.13	r=0.18	r= 0.35
Diet	r= -0.23	r= 0.33	r= 0.02	r=0.26
Pollution	r= 0.27	r= 0.08	r= 0.10	r= 0.13
Hereditary	r= -0.05	r= 0.12	r= -0.26	r= -0.28
Chance	r=0.35	r= 0.04	r= -0.34	r= 0.20
Stress	r= -0.01	r= 0.15	r= 0.05	r= 0.33
Own behaviour	r= -0.10	r=0.17	r=0.11	r= 0.41
Other people	r= 0.23	r= 0.16	r= -0.26	r= 0.29
Poor medical care	r= 0.01	r= 0.16	r= 0.27	r= 0.28
State of mind	r= -0.04	r= 0.14	r= 0.14	r= 0.35
Work stress	r= -0.21	r= 0.44*	r= 0.23	r= 0.16
Family stress	r= 0.15	r= 0.001	r= -0.05	r= 0.25
Weak constitution	r= 0.27	r= 0.07	r= -0.12	r= 0.22
Climate	r= 0.35	r= -0.06	r= -0.20	r= 0.34
Hard life	r= 0.28	r= -0.12	r= -0.14	r= 0.06
Fate	r= 0.62**	r= -0.33	r= -0.31	r= 0.07
Changes in diet will improve CHD	r= -0.04	r=0.40	r= -0.04	r=0.15
Led to diffs. in role in family	r= -0.08	r= -0.02	r= -0.36	r= 0.01
Affected position in community	r= -0.22	r= -0.02	r= -0.02	r= -0.22
Recovery dependent on chance or fate	r= -0.49**	r=0.27	r=0.19	r= -0.08

*significance $p \leq 0.01$, **significance $p \leq 0.004$

3.6.2 Correlations within Punjabi Group between Illness Representations, and Perceived Health Status and Psychological Adjustment

Tables 15 and 16 show that there were statistically significant correlations between illness identity score (perceived number and frequency of symptoms) and a number of perceived health status measures (appendix 28 and 29 for p values). Higher illness identity scores were associated with decreased perceived energy/vitality (p=0.0001), poorer perceived general health

perception (p=0.001), increased pain (p=0.002), poorer mental health (p=0.0001) and poorer physical (p=0.0001) and social functioning (p=0.0001). Higher illness identity scores were also associated with increased anxiety (p=0.001).

Increased belief in the causal role of fate was associated with poorer general health perception (p=0.001), poorer physical functioning (p=0.001) and increased role limitations due to physical problems (p=0.001). Increased perceived illness consequences was associated with reduced energy/vitality (p=0.004) and greater depression (p=0.004).

Table 15: Pearson correlations between illness representations and perceived health status (n=47) (*significance p<0.01, **significance p<0.004)

	Change in health	Energy/ vitality	General health perception	Mental health	Pain
Identity	r=0.04	r= -0.59**	r= -0.48**	r= -0.56**	r= -0.44**
Consequences	r= -0.23	r= -0.43**	r= -0.23	r= -0.24	r= -0.13
Control	r=0.03	r=0.15	r=0.40*	r=0.29	r=0.24
Timeline	r= -0.08	r= -0.07	r= -0.14	r=0.04	r= -0.08
Germ/ virus	r= -0.11	r= -0.19	r= -0.14	r= -0.17	r= -0.14
Diet	r= -0.01	r=0.12	r=0.23	r= -0.02	r= -0.10
Pollution	r=0.19	r=0.02	r=0.13	r=0.05	r= -0.18
Hereditary	r= -0.12	r= -0.06	r= -0.07	r= -0.12	r= -0.06
Chance	r= -0.04	r= -0.03	r= -0.09	r= -0.12	r= -0.19
Stress	r= -0.05	r= -0.41*	r= -0.16	r= -0.42*	r=0.10
Own behaviour	r= -0.01	r=0.03	r=0.03	r= -0.10	r=0.11
Other people	r= -0.20	r=0.04	r= -0.08	r= -0.23	r= -0.01
Poor medical care	r= -0.05	r= -0.02	r= -0.15	r= -0.12	r= -0.05
State of mind	r=0.01	r= -0.11	r= -0.17	r= -0.15	r=0.04
Work stress	r=0.27	r= -0.07	r=0.17	r=0.08	r=0.09
Family stress	r=0.06	r= -0.27	r= -0.12	r= -0.22	r= -0.20
Weak constitution	r= -0.01	r= -0.06	r= -0.15	r= -0.35	r= -0.06
Climate	r=0.04	r= -0.07	r= -0.03	r= -0.20	r= -0.03
Hard life	r=0.13	r= -0.07	r= -0.06	r= -0.08	r= -0.21
Fate	r=0.05	r= -0.41*	r= -0.47**	r= -0.34	r= -0.17
Changes in diet will improve CHD	r= -0.04	r=0.28	r=0.36*	r=0.25	r=0.13
Led to diffs. in role in family	r= -0.25	r= -0.37*	r= -0.23	r= -0.24	r=0.06
Affected position in community	r= -0.23	r= -0.09	r= -0.13	r= -0.18	r= -0.15
Recovery dep. on chance/fate	r=0.03	r= -0.10	r=0.15	r=0.04	r=0.21

Table 16: Continuation of Pearson correlations between illness representations and perceived health status, and anxiety and depression levels (n=47)

	Physical functioning	LE	LP	Social functioning	HAD-Anxiety	HAD-Depression
Identity	r= -0.60**	r= -0.28	r= -0.36*	r= -0.59**	r=0.47**	r=0.30
Consequences	r= -0.34	r= -0.07	r= -0.41*	r= -0.30	r=0.40*	r=0.43**
Control	r=0.20	r= -0.05	r=0.17	r=0.06	r= -0.14	r= -0.24
Timeline	r= -0.01	r=0.14	r=0.02	r=0.02	r=0.13	r=0.25
Germ/ virus	r= -0.29	r= -0.08	r= -0.25	r= -0.23	r=0.20	r= -0.08
Diet	r= -0.01	r=0.19	r=0.24	r=0.05	r= -0.06	r= -0.13
Pollution	r=0.12	r= -0.02	r=0.01	r= -0.05	r=0.02	r= -0.27
Hereditary	r= -0.003	r= -0.12	r= -0.27	r= -0.08	r=0.17	r=0.07
Chance	r= -0.33	r= -0.13	r= -0.09	r= -0.16	r= -0.05	r= -0.01
Stress	r= -0.16	r= -0.23	r= -0.19	r= -0.20	r=0.41*	r=0.37*
Own behaviour	r=0.01	r= -0.05	r= -0.08	r= -0.15	r=0.25	r=0.02
Other people	r= -0.22	r= -0.04	r= -0.07	r= -0.18	r=0.36*	r=0.23
Medical care	r= -0.02	r=0.01	r= -0.11	r= -0.24	r=0.09	r=0.10
State of mind	r= -0.23	r= -0.08	r= -0.19	r= -0.21	r=0.32	r=0.26
Work stress	r=0.15	r= -0.002	r= -0.02	r= -0.13	r=0.10	r= -0.08
Family stress	r= -0.25	r= -0.14	r= -0.18	r= -0.36*	r=0.36*	r=0.07
Weak constitution	r= -0.21	r= -0.19	r= -0.36*	r= -0.23	r=0.36*	r=0.28
Climate	r= -0.12	r= -0.06	r= -0.18	r= -0.18	r= -0.06	r= -0.07
Hard life	r= -0.14	r= -0.05	r= -0.13	r= -0.20	r= -0.07	r= -0.12
Fate	r= -0.49**	r= -0.16	r= -0.46**	r= -0.37*	r=0.23	r= -0.29
Changes in diet will improve CHD	r=0.04	r=0.26	r=0.33	r=0.24	r= -0.05	r= -0.21
Led to diffs. in role in family	r= -0.33	r= -0.17	r= -0.40*	r= -0.22	r=0.40*	r=0.40*
Affected position in community	r= -0.18	r= -0.14	r= -0.33	r= -0.29	r=0.16	r=0.32
Recovery dependent on chance or fate	r=0.40*	r= -0.17	r= -0.03	r=0.02	r=0.03	r= -0.02

LE=role limitations due to emotional problems, LP=role limitations due to physical problems
*significance $p \leq 0.01$, **significance $p \leq 0.004$

3.6.3 Verification of Results

A Spearman correlation was performed to verify the association between the causal item "other people" and seeking emotional social support. This revealed that it was no longer significant at the $p \leq 0.004$ level ($r=0.39$, $p=0.012$). Similarly, a Spearman correlation between belief in fate as a causal factor and role limitations due to physical problems was not statistically

significant (r= -0.33, p=0.023). Therefore, these results should be treated cautiously. Scattergrams indicated that none of the significant correlations were due to the influence of outlying values (appendix 30).

3.7 Associations within Punjabi Group between Coping, and Perceived Health Status and Psychological Adjustment

Statistical significance level was again set at $p \leq 0.004$, due to the number of correlations.

Tables 17 and 18 show that the only statistically significant association was between increased use of acceptance as a coping strategy and decreased perceived pain (p=0.001) (appendix 31 and 32 for p values). A scattergram suggested that this correlation was not due to the influence of outlying values (appendix 33).

Table 17: Correlations within Punjabi group between coping and perceived health status

Coping strategy (n=47)	Change in health	Energy/ vitality	General health perception	Mental Health	Pain	Physical function-ing
Planning	r=0.19	r=0.13	r=0.23	r=0.01	r=0.10	r=0.13
Seeking instru. social support	r= -0.03	r=0.11	r= -0.08	r=0.13	r= -0.10	r= -0.03
Seeking emotional social support	r=0.13	r= -0.06	r= -0.05	r=0.02	r= -0.10	r= -0.08
Acceptance	r=0.04	r=0.10	r=0.12	r=0.18	r=0.49**	r=0.04
Behavioural disengagement	r= -0.04	r= -0.10	r= -0.25	r= -0.30	r=0.13	r= -0.18
Humour	r= -0.03	r=0.30	r=0.16	r=0.09	r=0.13	r=0.30
English version of questionnaires only (n=35)						
Turning to religion	r=0.24	r= -0.004	r= -0.27	r= -0.14	r= -0.35	r= -0.39
Positive reinterpretation	r=0.38	r=0.30	r=0.46*	r=0.20	r=0.33	r=0.33
Alcohol/ drug use	r=0.13	r= -0.05	r=0.10	r=0.07	r=0.10	r=0.18
Focus on/ venting of emotions	r=0.12	r= -0.08	r= -0.09	r= -0.21	r= -0.11	r= -0.15

*significance $p \leq 0.01$, **significance $p \leq 0.004$

Table 18: Continuation of correlations within Punjabi group between coping and perceived health status, and anxiety and depression levels

Coping strategy (n=47)	Role limit. due to emotional problems	Role limit. due to physical problems	Social functioning	HAD-Anxiety	HAD-Depression
Planning	r= -0.23	r=0.03	r= -0.03	r=0.30	r= -0.08
Seeking instru. social support	r= -0.03	r= -0.04	r=0.05	r=0.08	r= -0.12
Seeking emotional social support	r= -0.05	r= -0.16	r= -0.14	r=0.07	r= -0.05
Acceptance	r=0.15	r=0.08	r=0.19	r= -0.13	r=0.02
Behavioural disengagement	r= -0.25	r= -0.23	r= -0.15	r=0.19	r=0.21
Humour	r= -0.03	r=0.22	r=0.15	r=0.07	r= -0.27
English version of questionnaires only (n=35)					
Turning to religion	r=0.11	r= -0.05	r= -0.11	r=0.05	r=0.06
Positive reinterpretation	r=0.07	r=0.16	r= -0.01	r=0.15	r= -0.18
Alcohol/ drug use	r= -0.12	r=0.13	r= -0.08	r=0.05	r= -0.12
Focus on/ venting of emotions	r= -0.17	r=0.03	r= -0.20	r=0.45*	r=0.02

*significance $p \leq 0.01$

3.8 Relative Contributions Of Ethnicity, Illness Representations and Coping to Perceived Physical Functioning and Psychological Adjustment

A series of hierarchical multiple regressions were performed to determine the relative contributions of ethnicity, illness representations and coping to perceived physical functioning, anxiety and depression. Demographic and medical variables were entered into each regression first in order to control for these factors. Measures which were significantly correlated at the univariate level ($p \leq 0.004$) with each of the outcome measures within both ethnic groups, were entered into the regression[4] (see appendix 34 for results of univariate correlations for Caucasian group). Variables were entered into the regression in blocks, with demographic variables (except ethnicity) entered first, followed

[4] Individual items were not entered when they were included in summated scales.

by the medical measures, then ethnicity, followed by illness representations and finally coping strategies (when significant correlations at the univariate level were present). Duration of CHD was not entered into the regressions, as this variable had a number of missing values.

Before carrying out each analysis, the independent variables were entered into a correlation matrix to identify any significant relationships between the variables. This established that none of the variables were so highly correlated that they could not be considered independent (appendix 35).

3.8.1 Physical Functioning

Demographic/medical indices and illness representations explained 44 percent of the variance in physical functioning. Ethnicity did not appear to add to the amount of variance that was explained. Illness representations explained 28 percent of the variance after controlling for demographic/medical indices. In particular, illness identity made a significant independent contribution, with the beta values showing that it explained a greater proportion of variance than the other variables (table 19).

Table 19: Relative contributions of demographic indices, medical measures, ethnicity and illness representations to perceived physical functioning (n=91)

Independent variable	B value	Beta value	significance
Gender	-10.98	-0.21	0.055
Socioeconomic group	-3.24	-0.07	0.487
Age	-0.28	-0.09	0.344
Education	1.28	0.06	0.566
Adjusted R square (incremental) =0.15			
Amount of medication	-0.43	-0.02	0.854
History of major cardiac event	3.69	0.07	0.427
Adjusted R square (incremental) =0.01			
Ethnicity	1.39	0.03	0.788
Adjusted R square (incremental) =0			
Identity	-1.75	-0.34	0.001*
Consequences	-8.65	-0.25	0.018
Control	8.51	0.19	0.064
Fate	-1.57	-0.08	0.472
Adjusted R square (incremental) = 0.28			
Total R square =0.52 Total Adjusted R square =0.44 Sig. of F= 0.0001*			

*significance $p \leq 0.01$

3.8.2 Anxiety

As shown in table 20, illness representations and the coping strategy: focusing on/venting of emotions, explained 40 percent of the variance in anxiety score. Demographic/medical indices and ethnicity, did not add to the amount of variance that was explained. Illness representations explained the greater proportion of variance, with perceived consequences making a significant independent contribution. Focusing on/venting of emotions also made a significant contribution, explaining 6 percent of the variance, after illness representations had been added to the equation.

Table 20: Relative contributions of demographic indices, medical measures, ethnicity, illness representations and coping to anxiety (n=79)
(Only participants who completed the English version of the questionnaires were included as regression included the coping strategy, focus on/venting of emotions.)

Independent variable	B value	Beta value	significance
Gender	0.61	0.07	0.553
Socioeconomic group	-0.88	-0.12	0.292
Age	-0.08	-0.17	0.101
Education	0.40	0.11	0.358
Adjusted R square (incremental) = 0			
Amount of medication	0.30	0.08	0.499
History of major cardiac event	-1.26	-0.16	0.122
Adjusted R square (incremental) = 0			
Ethnicity	1.12	0.14	0.210
Adjusted R square (incremental) = 0			
Identity	0.16	0.20	0.110
Consequences	1.83	0.35	0.007*
Pollution	0.49	0.15	0.212
State of mind	0.43	0.13	0.312
Adjusted R square (incremental) =0.34			
Focus on/ venting of emotions	0.35	0.28	0.013*
Adjusted R square (incremental) =0.06			
Total R square =0.51 Total Adjusted R square =0.40			Sig. of F= 0.0001*

*significance $p \leq 0.01$

3.8.3 Depression

Demographic indices, ethnicity, illness representations and the coping strategy: behavioural disengagement, accounted for 38 percent of the variance in depression score. Medical measures did not add to the amount of variance that was explained. Illness representations contributed most to the amount of variance that was explained (21%), with illness identity showing a significant independent contribution. Ethnicity accounted for 11 percent of the variance after controlling for demographic/medical indices and behavioural disengagement accounted for a further four percent.

Table 21: Relative contributions of demographic indices, medical measures, ethnicity, illness representations and coping to depression (n=91)

Independent variable	B value	Beta value	significance
Gender	-0.52	-0.06	0.607
Socioeconomic group	-0.05	-0.01	0.957
Age	-0.06	-0.12	0.242
Education	-0.30	-0.08	0.450
Adjusted R square (incremental) =0.02			
Amount of medication	-0.13	-0.03	0.778
History of major cardiac event	-0.02	-0.002	0.985
Adjusted R square (incremental) = 0			
Ethnicity	-2.14	-0.26	0.023
Adjusted R square (incremental) =0.11			
Identity	0.27	0.32	0.008*
Consequences	1.51	0.27	0.028
Pollution	0.08	0.02	0.852
Chance	0.45	0.13	0.259
Climate	-0.24	-0.06	0.675
Hard life	-0.08	-0.02	0.871
Adjusted R square (incremental) =0.21			
Behavioural disengagement	0.32	0.23	0.044
Adjusted R square (incremental) = 0.04			
Total R Square =0.50 Total Adjusted R square =0.38 Sig. of F= 0.0001*			

*significance $p \leq 0.01$

3.8.4 Verification of Results

For all three multiple regression, analysis of the residuals showed that there were no outliers. Cumulative probability plots of standardised predicted values against the standardised residuals showed a linear relationship, and the scatter-plots of residuals against predicted values did not show any trends (appendix 36).

4. DISCUSSION

4.1 Aims of the Study

The purpose of this study was to explore the relationship between ethnicity and illness representations, coping, perceived health status and psychological adjustment in people with CHD. Furthermore, it aimed to explore within a Punjabi group, the relationship between these variables and acculturation, as well as the relationship between illness representations, coping and adjustment measures. A number of hypotheses were generated.

4.1.1 Hypotheses one and two:

Punjabi participants will have a stronger belief than Caucasian participants in the following factors as causes of their heart condition: a.) fate; b.) family-related stress; c.) having a weak constitution; d.) diet; e.) climate. Whilst Caucasian participants will have a stronger belief that work-related stress was a factor in causing their heart condition.

As predicted, Punjabi participants were more fatalistic and had greater belief that having a weak constitution and the climate were factors in causing their heart condition than Caucasian participants. These findings concur with Lambert and Sevak's (1996) research into South Asians' general perceptions about illness. Therefore, they suggest that these may be quite global cultural beliefs about the causes of ill health rather than specific to CHD.

Although, Punjabi participants endorsed these causal beliefs more strongly than Caucasian participants, this difference appeared to reflect more Caucasians' lack of agreement with these factors, since the majority of Punjabi participants did not view them as causal. It was notable however, that no Caucasian participant considered that having a weak constitution was a causal factor and only one considered that climate was a factor. This suggests that within Western culture these factors are not considered to play a causal role in CHD.

South Asians' attribution of life events to fate has also been reported in a cross-cultural study of diabetic patients (Sissons Joshi, 1995). Although belief in fate was prevalent in the Punjabi group (40%), this prevalence rate is lower than has been reported in previous studies (64%; Sissons Joshi, 1995) However, in Sissons Joshi's study the term "karma" was used instead of "fate". This term was not used in the present study as it was felt that some Caucasian participants may not understand the meaning of the term. However, the term fate does not express the full meaning of karma and this may have led to it having less relevance to the Punjabi participants.

Contrary to the hypothesis, no statistical differences were found between ethnic groups on causal beliefs about diet, family or work-related stress. Beliefs about the causal role of diet in their heart condition were prevalent for both groups and may reflect that both within the Cardiology clinic and the Gurdwara, there was a lot of health promotion information about the importance of diet in CHD.

Sissons Joshi (1995) found that Indian participants viewed family-related stress as having a greater causal role in their diabetes than work-related stress, whilst the opposite was true for the Caucasian participants. However in this study, both groups held strong beliefs in work-related stress as a causal factor. The importance of work stress may reflect the high proportion of men in both ethnic groups, as it was found that men agreed more than women, that work-related stress was a causal factor.

4.1.2 Hypothesis three:

Punjabi participants will have a stronger belief than Caucasian participants that: a.) their heart condition has led to difficulties in their role in the family; b.) changes in their diet will improve their heart condition; c.) recovery from their heart condition is largely dependent on chance or fate.

In support of this hypothesis and in line with Sissons Joshi's (1995) findings, Punjabi participants held stronger beliefs that their heart condition had led to difficulties in their role in the family. This may reflect the particular importance within South Asian culture of the family and of attending to others' needs (Krause, 1989).

Findings from this study also support the hypothesis that Punjabi participants would agree more that recovery from their heart condition is largely dependent on chance or fate. However, although this finding suggests a more fatalistic view of their

illness, it is notable that ethnic groups did not differ in their perception of control over their heart condition.

The findings did not support the hypothesis that Punjabi participants would agree more that changes in their diet would improve their heart condition. Since this item was strongly endorsed by both ethnic groups, it may well be that the amount of health promotion information about diet and CHD, had generally led to diet being seen as very important in recovery from their heart condition.

4.1.3 Hypothesis four:

Ethnic groups will differ on measures of a.) illness representations (where direction of results has not been specified), b.) coping strategies, c.) perceived health status, d.) anxiety and e.) depression.

a.) Significant differences were found between the two groups on a number of illness representation items which had not been specifically predicted from previous research. The Punjabi group held a stronger belief in the causal factor of having had a hard life Piloting of the IPQ, had led to the inclusion of this item, as a number of Punjabi participants felt that the experiences they had undergone during their life, particularly the hardship and racism which they had experienced in building a life in the UK, had played a large role in causing their heart condition. Stress from immigration has previously been postulated as a possible mechanism for the increased prevalence of CHD in South Asians

living in Western societies (Williams et al., 1994). The findings from this study suggest that this is also a fairly common belief amongst lay Punjabis and warrants further exploration.

Increased agreement in the Punjabi group, that state of mind had a causal role in their heart condition, although not specifically predicted, is in line with previous research which has reported a preponderance of psychological models amongst Indian patients in discussing the possible causes of their diabetes (Sissons Joshi, 1995). The findings that Punjabi participants were more in agreement that a germ/virus and poor past medical care were causal factors in their heart condition, were unexpected. However, these results reflected the fact that the Caucasian group were strongly in disagreement with these factors. The Punjabi group's higher scores on these factors may reflect their general tendency to endorse more factors, whilst the Caucasian group appear to have more specific beliefs. The increased perception amongst the Punjabi group that their heart condition would last for a short length of time was also surprising, as there were no differences on medical indices. This may reflect a denial of the extent of their illness. Further research is needed to explore this.

The Punjabi group's increased belief that chance had played a causal role in their heart condition, although significant with parametric analysis, was no longer statistically significant with non-parametric analysis and therefore must be treated cautiously.

b.) The only significant difference between ethnic groups on the coping scales included in the study, was that Punjabi participants

more frequently cited turning to religion as a means of coping. As a proportion of the Punjabi participants had been recruited from a Gurdwara, it might be expected that this may bias the results. However, when data from the Gurdwara group were excluded from the analysis, the significant difference still remained. This result is in line with the findings of increased belief in fate as a causal factor and perceptions that recovery is dependent on chance or fate. They suggest increased religiosity amongst the Punjabi group, as well as reflecting specific cultural and religious beliefs.

The limited number of significant ethnic differences in use of coping strategies is in contrast with Chang's (1996) findings that Asian Americans (which included Indians) used more problem avoidance and social withdrawal coping strategies than Caucasian Americans. However, unfortunately five coping scales were dropped from the present study, with a number of these being problem-focused coping scales. Therefore, the study was limited in the range of coping strategies explored and as such may have missed ethnic differences.

c.) The finding that ethnic groups did not differ on perceived health status measures is in contrast with previous research which has reported that British South Asians report more pain for a given stimulus than Caucasians (Thomas & Rose, 1991) and have increased rates of somatisation (Farooq, Gahir, Okyere, Sheikh & Oyebodeet, 1995). However, it was noted that in the present study, both ethnic groups scored very poorly on all the health status measures compared to normative data for people with

long-standing illness (Jenkinson et al., 1996). A floor effect may have meant that ethnic differences could not be detected.

d.) and e.) Contrary to the hypothesis, ethnic groups did not differ on levels of anxiety, however, as predicted, they did differ in depression levels, with the Punjabi group having a higher depression score. There were no differences between groups in the number of participants who scored at the "caseness" level for anxiety or depression.

The finding of a significantly higher depression score in the Punjabi group but no significant differences in anxiety score, has also been reported by Farooq et al. (1995) in a study comparing South Asian and Caucasian primary care patients. Contradictory findings however, have come from Cochrane and Stopes-Roe (1981) who found that British South Asians had lower rates of psychological symptoms than Caucasians. However, their participants were not medical patients and it could be postulated that South Asians react specifically to ill health with more depression symptoms. The possible role of illness perceptions in this process is discussed in section 4.2.

4.1.4 Hypothesis five:

Within the Punjabi group, there will be an association between degree of acculturation and a.) illness representations, b.) coping strategies, c.) perceived health status, d.) anxiety and e.) depression.

a.) Increased belief in the causal factors of "fate" and a "hard life", and that recovery is dependent on chance or fate, were associated with being less acculturated. Although socioeconomic status was associated with acculturation, it was not significantly associated with these beliefs and therefore suggests that the findings of their association with acculturation were not a bi-product of differences in socioeconomic status.

The finding that increased fatalism was associated with being less acculturated, concurs with the idea that fatalistic views reflect more traditional South Asian beliefs. The association between acculturation and belief in the causal role of a "hard life", may reflect the fact that people who are less acculturated have experienced a harder life through difficulties in adjusting to living in the UK. The lack of a significant correlation between "hard life" and acculturation when Punjabis recruited at the Gurdwara (a less acculturated group) were excluded from the analysis, may be seen as evidence for this supposition.

Interestingly, there were a number of illness representations, which although they showed significant differences between ethnic groups were not associated with acculturation. This therefore suggests that these cultural beliefs are not incompatible with taking up Western cultural ideas.

b.) Increased use of turning to religion as an aide to coping, was associated with being less acculturated. This result is in line with the finding that increased fatalism was also associated with being less acculturated and generally suggests increased religiosity

amongst the less acculturated. The positive association between use of positive reinterpretation and growth, and acculturation, is interesting. It may be that a propensity to use this coping strategy means that they are more likely to view immigrating to the UK as an opportunity for self-development, and therefore may have taken on more Western concepts and ideas. However, this is a very speculative explanation and further research is needed. It is important to note that socioeconomic status was not associated with these coping strategies, suggesting that the results are not a bi-product of differences in socioeconomic status.

c.) The only significant association between perceived health status measures and acculturation, was that better physical functioning was associated with being more acculturated. However, it was noted that physical functioning was also associated with socioeconomic status, with the "manual" group perceiving that they had poorer physical functioning. The association between acculturation and physical functioning therefore, may be a bi-product of socioeconomic status and as such, consistent with general findings of a relationship between social inequality and health (Carroll, Davey-Smith & Bennett, 1997).

d.) and e.) Contrary to the hypothesis, no association was found between anxiety and depression scores, and acculturation. These findings are in contrast with Cochrane and Stopes-Roe (1981) who found that increased acculturation in Indian participants living in the UK, was associated with a more stable psychological adjustment. The lack of association between acculturation and

psychological adjustment in this sample, may reflect the fact that Punjabis generally moved to the study area in the 1960s and 1970s (Lambert & Sevak, 1996). Therefore, many Punjabi participants may have lived in the UK for some time and so adjusted to the stress of acculturation.

4.1.5 Hypothesis six:

Within the Punjabi group, there will be an association between illness representations and a.) coping strategies, b.) perceived health status, c.) anxiety and d.) depression.

a.) Illness representations were found to be associated with seeking emotional social support and turning to religion. The association between increased use of turning to religion and fatalistic beliefs, seems conceptually logical. It also provides support within a Punjabi sample, for Leventhal et al.'s (1992) concept of illness representations shaping coping.

The association between belief in other people as having a causal role in their heart condition and seeking emotional social support, although significant using parametric analysis, was no longer significant using non-parametric analysis and must therefore be interpreted cautiously. However, it suggests that in Punjabi participants, there may be an association between more emotional beliefs and coping strategies. Clearly further research is needed in this area both to verify this finding and gain increased understanding as to the mechanisms behind it.

b.), c.) and d.) Illness identity was significantly associated with a number of perceived health status measures. Higher illness identity scores were associated with decreased energy/vitality, poorer general health perception, increased pain and poorer physical and social functioning. These findings seem conceptually logical, such that if a person views themselves as having more symptoms, it might be expected that they would consider that their illness generally had more negative effects on their health status. Higher illness identity scores were also associated with increased anxiety and poorer mental health. Similar findings have been reported by Moss-Morris et al. (1996) who found in a study of CFS patients, that illness identity was associated with disability levels, vitality and psychological adjustment. Due to the cross-sectional nature of both Moss-Morris et al.'s study and the current study, it is unclear however, whether poorer mental health results in increased somatisation or whether increased perception of symptoms generates greater distress.

Increased belief in fate as a causal factor was associated with poorer general health perception and physical functioning. This factor was also associated with increased role limitations due to physical problems, although this finding was no longer significant using non-parametric analysis. Again as these findings are cross-sectional the direction of the relationship is unknown. However, it was notable that belief in recovery being dependent on chance or fate was not statistically associated with any of the health status measures, suggesting that poorer perceived health and physical functioning were not a result of a more passive approach being taken towards their health.

Evidence of a more fatalistic attitude leading to poorer physical functioning has come from a study undertaken in Israel (Bar-On, 1987). In this study, it was found that fatalistic attributions during hospitalisation following a first time MI, predicted lower rates of return to work and poorer physical and sexual functioning. This finding remained significant even after controlling for severity of MI.

The finding that increased perceived illness consequences was associated with decreased energy/vitality, suggests that lack of energy plays an important role in the effects a heart condition has on people's lives. There was also found to be an association between increased illness consequences and greater depression. Kemp et al. (1999) in a study with epilepsy patients similarly found that patients who perceived that their epilepsy had pervasive effects on their lives reported greater distress. Direction of causality however, is unclear. It seems likely that there is a reciprocal effect, with increased illness consequences leading to greater depression which then results in further negative consequences.

4.1.6 Hypothesis seven:

Within the Punjabi group, there will be an association between coping strategies and a.) perceived health status, b.) anxiety and c.) depression.

a.) The results revealed that the only significant association within the Punjabi group between perceived health status and coping, was the finding that increased use of acceptance was associated with less reported pain. The mechanisms behind this association are unclear. However, it may be that having less pain, makes it easier to accept your heart condition.

b.) and c.) Contrary to the hypothesis, there was a lack of association within the Punjabi group, between coping styles and psychological adjustment. This finding may reflect the fact that a number of coping scales were dropped from the study and for some scales, data were only included for participants who had completed the English version, as well as the stringent significance level. However, this lack of significant associations may suggest that amongst Punjabis, these coping strategies are not so relevant to adjustment. Clearly, research is needed to explore this further.

4.1.7 Hypothesis eight:

There will be a difference in the relative contributions of participants' ethnicity, illness representations and coping strategies to a.) perceived physical functioning, b.) anxiety and d.) depression.

a.) Ethnicity did not explain any of the variance in physical functioning, whilst illness representations explained 28 percent of the variance, after controlling for demographic/medical indices. None of the coping scales were significant at the univariate level and so were not entered into the regression.

The finding that ethnicity did not explain any of the variance in physical functioning is surprising and suggests that although there are significant ethnic differences in illness representations, these differences do not affect physical functioning. These findings have some similarities to previous research. Moss-Morris et al. (1996) found that illness representations explained far more of the variance in dysfunction than coping, with illness identity and perceived consequences being significant predictors.

b.) Ethnicity did not explain any variance in anxiety score. However, illness representations explained 40 percent of the variance and focus on/venting of emotions explained 6 percent of the variance after controlling for illness representations. This indicates that ethnic differences in illness perceptions and coping do not affect anxiety levels. The associations between venting of emotions and poorer mental health has been reported in previous research (Moss-Morris et al., 1996).

c.) Ethnicity, illness representations and coping differed in their relative contributions to depression score. Illness representations accounted for the most amount of variance (21%). Ethnicity accounted for 11 percent of the variance with Punjabis having higher depression scores. Behavioural disengagement was also a positive predictor of depression level, accounting for 4 percent of the variance after controlling for illness representations. Moss-Morris et al. (1996) have similarly reported that illness identity and behavioural disengagement are significant predictors of psychological adjustment.

Overall, it would appear that illness representations had a greater relative contribution than ethnicity and coping for all the adjustment measures. The relative contributions of ethnicity and coping were variable, with ethnicity only predictive of depression score, whilst coping accounted for a small amount of variance in anxiety and depression score. Therefore, there is mixed support for this hypothesis.

4.2 Theoretical Implications

As highlighted by Landrine and Klonoff (1992), these results suggest that a person's culture plays an important role in shaping their illness perceptions. It would seem that the broader socio-religious belief system of the South Asian culture, such as a belief in fate and in the need for a balanced lifestyle, together with the view of the importance of individual constitution, were important in influencing beliefs about their heart condition and coping strategies employed. However, the results also demonstrate that South Asian cultural beliefs about their heart condition are not homogenous but reflect a range of views, with an interweaving of traditional South Asian beliefs and more Western concepts.

Findings of increased depression levels within the Punjabi group and of the importance of ethnicity in predicting depression, is particularly concerning given recent research which has indicated that depression in CHD patients, is a key determinant of later morbidity (Frasure-Smith, Lesperance & Talajic, 1995). Perceived consequences was the only measure, within the Punjabi group,

significantly associated with depression. It may be that the consequences of having CHD has a particular important impact on depression levels in the Punjabi group.

Findings of the importance of illness representations lends support to Leventhal et al.'s (1992) model and suggests that it has some relevance to a Punjabi population. However, the limited number of associations within the Punjabi group between illness representations and coping, and between coping and adjustment measures, suggests that there are cultural differences in the way that coping functions, and that Leventhal et al.'s (1992) model has greater explanatory power within a Caucasian culture.

4.3 Methodological Issues

4.3.1 Measures

The issue of reliability and validity of measures was a major consideration in this study and efforts were made to use standardised measures. The internal reliability of the new Acculturation Scale was similar to the original questionnaire suggesting that it was applicable to an adult population and that the amendments had not unduly affected its reliability.

Use of the dispositional version of the COPE, with verbal instructions to complete the questionnaire based on how they cope with their heart condition, may have been confusing to some participants. On reflection, it would have been preferable to

modify the written instructions to the questionnaire to make this clearer.

Further methodological issues were that the IPQ, COPE and SF36 had not been validated with a South Asian population. Additional items were added to the IPQ to improve its content and face validity with a Punjabi population. These items improved the internal reliabilities for all but the Punjabi translation of the consequence scale. The COPE, SF36 and HAD were also piloted with a sample of Punjabi participants to help ensure their face validity. The internal reliabilities of the English version of the IPQ, SF36 and HAD scales which were completed by Punjabi participants, were good. The internal reliabilities however of a number of the COPE scales, were poor and the scales were excluded from the study. A number of these scales also had poor reliability with the Caucasian group, suggesting that some of the constructs generally did not appear to be robust for this sample. This may partly have been due to a fatigue effect, as this questionnaire was quite long. A shorter questionnaire, such as the Ways of Coping Checklist (Folkman & Lazarus, 1980), may have reduced this effect. However, this questionnaire is not as theoretically based and comprehensive as the COPE.

Translation of the questionnaires also raised a number of methodological issues. Back translations suggested relatively good semantic equivalence, although it was recognised that in translating between two such disparate languages, exact semantic equivalence could not always be achieved. The translated versions of the questionnaires were piloted to ensure face validity. Internal

reliability checks were performed to ascertain whether the items grouped together in a similar manner as the original. The internal reliabilities of the IPQ and SF36 scales were good, suggesting that there were similar constructs within the translated versions as in the originals. Moreover, the lack of significant differences between Punjabi participants who completed the English or the Punjabi version of the questionnaires, suggested that they were measuring similar constructs. However, a number of the COPE scales had poor internal reliability. Many of these scales also demonstrated poor internal reliability for Punjabi participants completing the English version, suggesting that it was not a result of the translation. However, for four of the scales, only the Punjabi version had poor internal reliability, suggesting that the translated versions were not valid scales. These scales were therefore excluded from the study.

The internal reliability of the HAD anxiety scale was good, however the Punjabi depression scale's Cronbach alpha was 0.57. This was below the 0.60 cut-off recommended by Fitz-Gibbon and Morris (1987). However, given the scale's importance as an outcome measure and that it was approaching significance, it was included in the study. Therefore, results involving this scale must be treated cautiously.

The reliability of the translated questionnaires would have been improved if test-retest reliability had been assessed. However, it was recognised that these scales naturally fluctuate over time. It was also considered that a sample of Punjabi participants could have completed both the Punjabi and English translation of the

questionnaires, to allow a comparison of the results. However, given the length of the questionnaires, this proved impractical and the results would have been subject to fatigue effects.

4.3.2 Statistical Issues

The data yielded by the study were of varying quality. In particular, the IPQ causal items data had a relatively small range. The degree to which much of the data can be said to represent interval data for parametric analysis was also questionable. Parametric analysis was undertaken, as it has greater statistical power than non-parametric analysis and there is no non-parametric alternative to multiple regression. The multiple regression model is also considered sufficiently robust to withstand deviations from the ideal data set (Tabachnick & Fidell, 1989). Attempts were made to increase confidence in the results by supporting significant findings, involving variables which did not meet the conditions of parametric analysis, with alternative analysis.

The number of participants recruited did not meet the requirements to attain a power of 0.80 (i.e. 64 participants within each group). Recruitment proved more difficult than originally anticipated as many of the potential participants did not have diagnosed CHD or had another serious medical condition as well. The reduced number of participants meant that the study had lower power. This increased the potential for Type I and II errors. To guard against the possibility of Type I errors, the significance

level was set at a relatively low level, especially for the correlations. However, this may have resulted in Type II errors.

4.3.3 Study Design

The cross-sectional design of the study meant that causal relationships could not be established. Correlations between variables may also have been due to another variable not included in the study.

Perceived physical functioning was chosen as a dependent variable because it was felt that it was the best measure of the perceived physical effects of CHD. However, it may be argued that changes in social functioning may impact more on participants' quality of life.

There were a number of issues regarding the medical indices. The use of amount of prescribed angina-related medication, as a measure of severity of CHD was relatively crude and may have been affected by psychological factors, such as the amount of distress participants expressed. There were also missing data regarding the length of time that participants had experienced CHD,as participants were frequently unsure of this and it was not always recorded clearly in the medical notes. Therefore, physiological factors, not measured in this study may have affected illness perceptions. The study would have been improved if a more objective measure of illness severity, such as number of coronary vessels occluded, had been employed.

The use of a questionnaire design also raises a number of issues. Participants' responses to questions may have been subject to social desirability effects (Sheeran & Orbell, 1996), with participants' answers reflecting what they felt were the correct answers rather than reality. This may be particularly prominent for the COPE scales, especially the use of drugs/alcohol, as the Sikh and Moslem religions (the two main religions of Punjabis) forbid the use of alcohol or illicit drugs. An acquiescence effect, that is a tendency to agree with questions, may also have affected answers. The finding that the Punjabi group agreed with significantly more causal items than the Caucasian group, may reflect an increased acquiescence effect in this group.

It was felt that the presence of a Caucasian researcher may have biased the results, such that Punjabi participants may not have wanted to offend the researcher (e.g. in completing the acculturation questionnaire) or may have considered that certain answers would be more acceptable to a Caucasian researcher. However, Lambert and Sevak (1996) have discussed that a South Asian researcher may also lead to a bias in South Asian participants' responses, as an assumption of shared experiences may mean that participants underplay aspects of their lives.

It may also be considered that the task of representing Punjabis' experiences of CHD should be left to a Punjabi psychologist. The researcher endeavoured to work closely with a number of Punjabis in devising the project, so that it was not approached from a perspective of naivety. It was also felt that given the lack

of research in this area, not to undertake this study because of the researcher's own ethnicity, was unjustified.

4.4 Implications for Further Research

The limitations of the current study carry a number of implications for further research.

Studies involving longitudinal designs would allow exploration of the temporal relationship between illness representations, coping and adjustment measures, within different ethnic groups. Petrie et al. (1996) have described a well-designed longitudinal study in which patients' initial perceptions of their illness following a MI, were predictive of later recovery. It would be important to explore how ethnic differences in illness representations affect later recovery and in particular levels of depression.

Studies involving a larger sample size would address the problems of power in the study. Future research should also consider including physiological measures of CHD both to control for the severity of CHDand as an outcome measure.

The present study highlighted the importance of religion for Punjabi participants. However, this study did not differentiate between participants of different religions. Research in this area may provide interesting findings as to how religion interacts with illness beliefs, coping and outcome. Lambert and Sevak (1996) have suggested that it is the intensity of religious beliefs rather than the religion itself, that affects health beliefs. Research

exploring the effects of religiosity on health related behaviours would help to provide insight into this area.

Gender differences in CHD have previously been highlighted as an under researched area (Holahan, Moos, Holahan & Brennan, 1995). Whilst this study did not reveal many significant gender differences, findings of a poorer general health perception and increased symptoms in women were interesting and warrant further research. Research exploring how these gender differences then interact with ethnicity would be important.

Finally, further research is needed to ascertain whether the present findings are generalisable to other medical conditions and to other ethnic groups. In particular, it would be important to explore the differences between Punjabis and other South Asian groups, as well as other ethnic minorities.

4.5 Clinical Implications

The results of this study have a number of implications for clinical psychologists involved in the care of cardiac patients.

This study found that there was a high rate of psychological distress in people with CHD. In particular, Punjabi participants were more depressed than Caucasian participants, with 23 percent of Punjabis scoring at a caseness level for depression. The reasons for this increased level of depression in Punjabi participants are unclear, although the findings do suggest that the consequences of having a heart condition may have a greater impact on their

mood. These findings indicate that clinicians should be alert to how their Punjabi patients are adjusting to having a heart condition and referrals should be made to psychologists where appropriate.

This study suggests that there are ethnic differences in the way that Caucasian and Punjabi patients perceive their heart condition. Therefore, psychologists working with Punjabi clients, need to be culturally sensitive to the fact that their clients' illness perceptions may be very different from their own or from Caucasian clients'. In particular, fatalistic beliefs may be important to Punjabi clients and are associated with poorer perceived functioning on a number of health status measures. Therapeutic work exploring how these beliefs interact with perceived health status may be helpful in improving quality of life.

In working with cardiac patients more generally, this study suggests that rehabilitation programmes could be enhanced by focusing on people's individual beliefs about their CHD, especially perceptions about their symptoms. This may help in improving perceived health status, and anxiety and depression levels. Psychologists have an important role both in developing and evaluating these programs.

4.6 Summary

The aim of the study was to explore the relationship between ethnicity and illness representations, coping, perceived health status and psychological adjustment in people with CHD.

Furthermore, it aimed to explore within a Punjabi group, the relationship between these variables and acculturation, as well as the relationship between illness representations, coping and adjustment measures.

Ethnic differences were most notable in participants' illness representations. Only one coping strategy was significantly different between the two groups. There were no differences on perceived health status measures and in anxiety levels. Punjabis were significantly more depressed than Caucasian participants, with ethnicity predicting 11 percent of the variance in depression score.

Within the Punjabi group, acculturation was found to be associated with illness representations, coping strategies and physical functioning (although this last finding was confounded by socioeconomic class). Illness representations were associated with adjustment measures, however there were few associations between illness representations and coping strategies, and between coping strategies and adjustment measures. This raises questions about the explanatory power of Leventhal et al.'s (1992) model in a Punjabi population. However, it was acknowledged that there were methodological issues which may have affected these results and further research is needed.

Overall, it appeared that illness representations were more important than ethnicity and coping in accounting for the variance in perceived physical functioning and psychological adjustment.

It is suggested that psychological support should be available for people with CHD and that this may be particularly important for Punjabi patients. Psychologists should be culturally sensitive in working with Punjabi clients with CHD, with an awareness that certain beliefs may be particularly salient. However, there is also much variation within ethnic groups and psychologists should endeavour not to take a stereotypical view.

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